TENNESSEE

End of Course Assessment
Algebra I

HOUGHTON MIFFLIN HARCOURT

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4500000000 A B C D E F G

Contents

To the Student

These practice activities are correlated to the state performance indicators for Algebra I and are designed to prepare you to take Tennessee's high school assessment test. The practice tests reflect the type of wording likely to be encountered on the actual test.

Mathematics State Performance Indicators

ALGEBRA I

Standard 1—Mathematical Processes

State Performance Indicators:

SPI 3102.1.1 Interpret patterns found in sequences, tables, and other forms of quantitative information using variables or function notation.

SPI 3102.1.2 Write an equation symbolically to express a contextual problem.

SPI 3102.1.3 Apply properties to evaluate expressions, simplify expressions, and justify solutions to problems.

SPI 3102.1.4 Translate between representations of functions that depict real-world situations.

SPI 3102.1.5 Recognize and express the effect of changing constants and/or coefficients in problem solving.

SPI 3102.1.6 Determine and interpret slope in multiple contexts including rate of change in real-world problems.

Standard 2—Number & Operations

State Performance Indicators:

SPI 3102.2.1 Operate (add, subtract, multiply, divide, simplify, powers) with radicals and radical expressions including radicands involving rational numbers and algebraic expressions.

SPI 3102.2.2 Multiply, divide, and square numbers expressed in scientific notation.

SPI 3102.2.3 Describe and/or order a given set of real numbers including both rational and irrational numbers.

Standard 3—Algebra

State Performance Indicators:

SPI 3102.3.1 Express a generalization of a pattern in various representations including algebraic and function notation.

SPI 3102.3.2 Operate with polynomials and simplify results.

SPI 3102.3.3 Factor polynomials.

SPI 3102.3.4 Operate with, evaluate, and simplify rational expressions including determining restrictions on the domain of the variables.

SPI 3102.3.5 Write and/or solve linear equations, inequalities, and compound inequalities including those containing absolute value.

SPI 3102.3.6 Interpret various relations in multiple representations.

SPI 3102.3.7 Determine domain and range of a relation, determine whether a relation is a function and/or evaluate a function at a specified rational value.

SPI 3102.3.8 Determine the equation of a line and/or graph a linear equation.

SPI 3102.3.9 Solve systems of linear equation/inequalities in two variables.

SPI 3102.3.10 Find the solution of a quadratic equation and/or zeros of a quadratic function.

SPI 3102.3.11 Analyze nonlinear graphs including quadratic and exponential functions that model a contextual situation.

Standard 4—Geometry & Measurement

State Performance Indicators:

SPI 3102.4.1 Develop and apply strategies to estimate the area of any shape on a plane grid.

SPI 3102.4.2 Solve contextual problems using the Pythagorean Theorem.

SPI 3102.4.3 Solve problems involving the distance between points or midpoint of a segment.

SPI 3102.4.4 Convert rates and measurements.

Standard 5—Data Analysis, Statistics, & Probability

State Performance Indicators:

SPI 3102.5.1 Interpret displays of data to answer questions about the data set(s) (e.g., identify pattern, trends, and/or outliers in a data set).

SPI 3102.5.2 Identify the effect on mean, median, mode, and range when values in the data set are changed.

SPI 3102.5.3 Using a scatter-plot, determine if a linear relationship exists and describe the association between variables.

SPI 3102.5.4 Generate the equation of a line that fits linear data and use it to make a prediction.

SPI 3102.5.5 Determine theoretical and/or experimental probability of an event and/or its complement including using relative frequency.

Name _____ Date _____

Pre Test

1 What is the value of $|12 - 9x|$ for $x = -2$?

A -30

B -6

C 6

D 30

2 Which fraction is between 0.125 and 0.298?

F $\frac{3}{16}$

G $\frac{7}{20}$

H $\frac{9}{25}$

J $\frac{5}{12}$

3 What is the solution set of $|y + 6| \leq 5$?

A $\{y \mid 1 \leq y \leq 5\}$

B $\{y \mid -5 \leq y \leq -1\}$

C $\{y \mid -11 \leq y \leq -1\}$

D $\{y \mid -11 \leq y \leq 5\}$

4 Which expression is equivalent to $\left(\frac{2}{x}\right)^2 + \left(\frac{3}{y}\right)^3$?

F $\frac{4}{x^2} + \frac{y^3}{9}$

G $\frac{x^2}{4} + \frac{y^3}{27}$

H $\frac{4}{x^2} + \frac{27}{y^3}$

J $\frac{x^2}{4} + \frac{9}{y^3}$

GO ON

Name _____ Date _____

Pre Test (continued)

5 What is the solution set of $-3|y - 2| = 12$?

A the empty set, $\{\varnothing\}$

B $\{6, 6\}$

C $\{-2, -2\}$

D $\{2, 2\}$

6 Jerry has a painting with an area of 2.573×10^8 in^2. The length of the painting is 8.3×10^4 in. What is the width?

F 0.31×10^1 in.

G 3.1×10^3 in.

H 0.31×10^3 in.

J -5.727×10^4 in.

7 What is the range of $f(a) = -4a + 1$ if the domain is $\{-3, 0, 3\}$?

A $\{-3, 0, 3\}$

B $\{-11, -0.5, 0.25, 1, 13\}$

C $\{-11, 1, 13\}$

D $\{1, 0.25, -0.5\}$

8 Which expression represents the enrollment of a school that starts the school year with 825 students and, during the year, x students move away and y students move in?

F $825 - x + y$

G $825 + x + y$

H $825 + x - y$

J $825 - (x + y)$

GO ON

Name _____ Date _____

Pre Test (continued)

9 The diameter of a circle has endpoints $(-1, 2)$ and $(3, -6)$. What are the coordinates of the center of the circle?

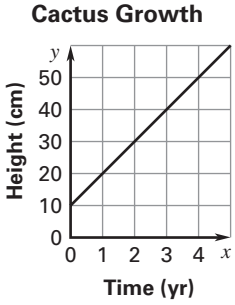
A $(1, -2)$

B $(2, 4)$

C $(-1, 2)$

D $(2, -4)$

10 The graph shows the height of a cactus plant over the 4 years since Melissa began measuring it. What does it mean if the slope of the line triples but the y-intercept remains the same?



F There is no change in the growth of the cactus.

G The cactus was 30 cm high when Melissa began measuring it.

H The cactus will grow three times slower.

J The cactus will grow three times faster.

11 Which expression represents the phrase *ten less than twice the sum of a number and four?*

A $10 - 2n + 4$

B $10 - 2(n + 4)$

C $2n + 4 - 10$

D $2(n + 4) - 10$

12 What is the solution of the system shown below?

$2x - y = 7$

$y = -3x + 5$

F $(12, 17)$

G $\left(\frac{12}{5}, \frac{11}{5}\right)$

H $\left(\frac{12}{5}, -\frac{11}{5}\right)$

J $\left(\frac{12}{5}, -\frac{59}{5}\right)$

GO ON

Name _____ Date _____

Pre Test (continued)

13 Simplify

$$\frac{v^2 + v - 12}{5v + 10} \cdot \frac{-v - 2}{v^2 + 5v + 4}.$$

A $\frac{(v - 3)}{5(v + 1)}$

B $\frac{-(v + 3)}{(v + 1)}$

C $\frac{-(v - 3)}{5(v + 1)}$

D $\frac{-(v - 3)}{(v + 1)}$

14 Which type of function would you use to model the path of a soccer ball kicked into the air?

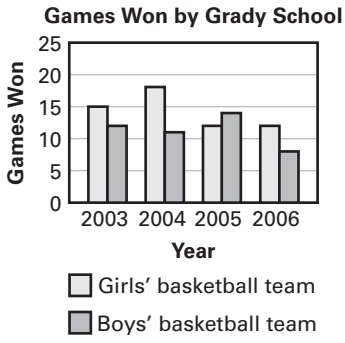
F linear

G quadratic

H $y =$ constant

J absolute value

15 Over the four years from 2003 to 2006, about how many more games did the girls' team win than the boys' team?



A 8

B 12

C 15

D 18

16 Evaluate $\frac{x - 1}{4 - x}$ for $x = -3$.

F -4

G $-\frac{4}{7}$

H $\frac{2}{7}$

J 2

GO ON

Name _____ Date _____

Pre Test (continued)

17 Which of the following is listed in order from greatest to least?

A $\frac{5}{12}, \frac{4}{5}, \frac{3}{8}$

B $1.2, 0.6, -0.5$

C $-\frac{5}{9}, -0.5, -\frac{2}{5}$

D $-6.8, -5.6, 4.0$

18 Hector has 6 times as many coins as Wilma. If Hector has 126 coins, which equation would you use to find out how many coins c Wilma has?

F $c + 6 = 126$

G $6c = 126$

H $c = \frac{126 + 6}{6}$

J $126c = 6$

19 The Oxnard Juice Works makes a juice blend by combining two different types of juice. One type costs \$3.50 per gallon and the other costs \$4.25 per gallon. How many gallons of each are needed to make 100 gallons of juice that costs \$4.00 per gallon?

A 25 gallons of \$3.50 juice and 75 gallons of \$4.25 juice

B 40 gallons of \$3.50 juice and 60 gallons of \$4.25 juice

C $33\frac{1}{3}$ gallons of \$3.50 juice and $66\frac{2}{3}$ gallons of \$4.25 juice

D 50 gallons of each type of juice

20 A rectangle has a width that is 13 units less than three times its length. If the length of the rectangle is x units, which expression represents the area of the rectangle in square units?

F $3x - 13$

G $3x^2 - 13x$

H $3x^2 + 13x$

J $13x^2 - 3$

GO ON

Name _____ Date _____

Pre Test (continued)

21 What is the distance between the points $(-5, 3)$ and $(-8, 7)$?

A 13.60

B 5

C 25

D 4.82

22 The formula for converting from Fahrenheit (F) degrees to Celsius (C) degrees is $C = \frac{5}{9}(F - 32)$. Find F if $C = 20$.

F 340

G 68

H $29\frac{3}{5}$

J $-6\frac{2}{3}$

23 A data set with one outlier has a mean of 80, median of 78, mode of 83, and range of 80. The outlier is 25. What effect does excluding the outlier have on the mean?

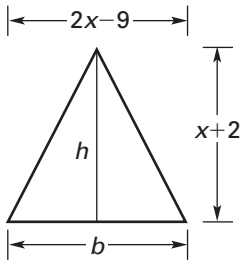
A It increases the mean.

B It decreases the mean.

C It does not affect the mean.

D cannot be determined

24 Use the formula for the area of a triangle, $A = \frac{1}{2}bh$, where b is the length of the base and h is the height, to write an expression for the area of the triangle shown below.



F $x^2 - 9$

G $x^2 - \frac{5}{2}x - 9$

H $x^2 - 5x - 18$

J $2x^2 - 5x - 18$

GO ON

Name _____ Date _____

Pre Test (continued)

25 Max needs to make a pizza that has an area of 200.96 in^2. Using $\pi = 3.14$, what is the radius of Max's pizza?

A 8 in.

B 25 in.

C 32 in.

D 64 in.

26 One batch of muffins calls for $\frac{2}{3}$ cup of peanuts. Sheena has $\frac{10}{3}$ cups of peanuts. How many batches of muffins will Sheena be able to make?

F $\frac{5}{3}$

G 5

H $\frac{8}{3}$

J 4

27 Simplify.

$$\frac{4x^4 + 2x^3 - 2x^2}{8x^3 - 12x^2 + 4x}$$

A $\frac{x}{2}$

B $\frac{x(x + 1)}{2(x - 1)}$

C $\frac{2x(x + 1)}{x - 1}$

D $\frac{2x^2(x + 1)}{4x(x - 1)}$

28 The length of a rectangle is 12 feet longer than its width. If the perimeter of the rectangle is 56 feet, what is the area of the rectangle?

F 240 ft^2

G 180 ft^2

H 140 ft^2

J 160 ft^2

GO ON

Name _____ Date _____

Pre Test (continued)

29 Ashley has $15. Apples cost $.45 apiece at a Mini Market. Which table shows how much money *m* Ashley will have left after buying *a* apples?

A

a	*m*
0	$15.00
2	$14.55
5	$14.10

B

a	*m*
0	$15.00
2	$14.10
5	$13.20

C

a	*m*
0	$15.00
2	$14.10
5	$12.75

D

a	*m*
0	$15.00
2	$9.00
5	$0.00

30 It rained an average of 1.9 inches each month for six months. During the seventh month it rained 1.2 inches. How does including the data from the seventh month affect the mean?

F It increases the mean.

G It decreases the mean.

H It does not change the mean.

J cannot be determined

31 If today's temperature is 50°F, and Kathie needs to record it in degrees Celsius, what value should she record?

$$C = \frac{5}{9}(F-32)$$

A $-15°$

B $10°$

C $20°$

D $32.4°$

32 What happens to the *y*-intercept of the graph of $y = x$ when the equation is changed to $y = x + 3$?

F The *y*-intercept does not change.

G The *y*-intercept changes from 0 to 3.

H The *y*-intercept changes from 0 to -4.

J The *y*-intercept becomes equal to the *x*-intercept.

GO ON

Name _____ Date _____

Pre Test (continued)

33 What will be the 10th term in the sequence below?

50, 47, 44, 41, 38, …

A 20

B 23

C 26

D 83

34 The data in the table below show the cost in dollars, C, of painting a wall and the number of cans of paint, n, needed to paint the wall.

n	1	2	3
C	42	49	56

If the number of cans of paint, n, were graphed on the horizontal axis and cost, C, were graphed on the vertical axis, what would be the equation of the line that fits the data?

F $C = 7n + 35$

G $C = -7n + 35$

H $C = 7n$

J $C = 35n$

35 The data in the table below show the cost in dollars, C, of painting a wall and the number of cans of paint, n, needed to paint the wall.

n	1	2	3
C	42	49	56

Using the equation found in Exercise 34, how much would it cost to paint a wall with 5 cans of paint?

A \$35

B \$0

C \$175

D \$70

36 The following data are scores on a quiz.

80, 60, 50, 60, 90, 80, 80, 70, 90

A tenth student scores a 70. What will happen to the median if this tenth score is included?

F It will increase.

G It will decrease.

H It will not change.

J It will equal 70.

GO ON

Name _____ Date _____

Pre Test (continued)

37 What is the solution of the system shown below?

$3x + 2y = 6$
$4x + 2y = 9$

A $\left(-3, \frac{3}{2}\right)$

B $\left(3, -\frac{3}{2}\right)$

C $\left(-3, -\frac{3}{2}\right)$

D $\left(3, \frac{3}{2}\right)$

38 Simplify $\sqrt{12x^4}$.

F $2x^2\sqrt{3}$

G $4x^2\sqrt{3}$

H $6x^2$

J $8x^2\sqrt{3x}$

39 Which rule describes the relationship between x and y in the table?

x	y
-2	3
-1	0
1	0

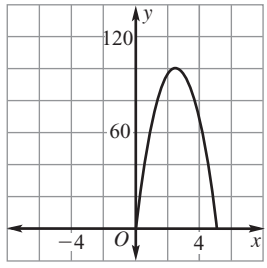
A $y = x + 1$

B $y = 3x$

C $y = 3x - 1$

D $y = x^2 - 1$

40 The graph below gives the distance above the ground, in feet, of an object thrown upward. After how many seconds will the object reach its highest point above the ground?



F 2 sec

G 2.5 sec

H 3 sec

J 2 sec and 3 sec

GO ON

Name _____ Date _____

Pre Test (continued)

41 Evaluate the expression $(2 \times 10^6)(3 \times 10^{-2})$.

A 6×10^{-12}

B 6×10^{-8}

C 6×10^{4}

D 6×10^{8}

42 Josh has a pet-sitting service. He charges a fixed fee plus an additional daily charge. The table below shows Josh's prices.

Days Worked	1	2	3	4
Amount Charged	19	26	33	40

What is Josh's daily charge?

F \$5.50/d

G \$7.00/d

H \$8.50/d

J \$12.00/d

43 Which expression shows $4x^2 + 12x + 8$ completely factored?

A $(x + 2)(4x + 4)$

B $4(x - 2)(x - 1)$

C $2(2x + 4)(x + 1)$

D $4(x + 2)(x + 1)$

44 Which expression describes the nth term of the sequence of odd numbers that are greater than or equal to 3?

F $n + 1$

G $n - 1$

H $2n + 1$

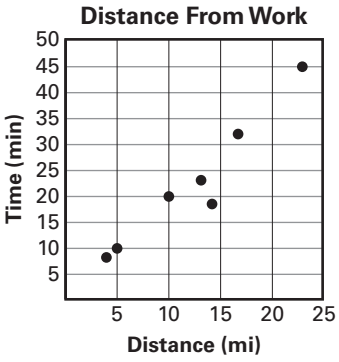
J $3n$

GO ON

Name _____ Date _____

Pre Test (continued)

45 Which statement best describes the relationship between the distance people live from work and the time it takes for them to get there?



A There is no correlation.

B There is a strong positive correlation.

C There is a strong negative correlation.

D There is a weak negative correlation.

46 Suppose you toss a coin 50 times and it lands on heads 29 times. What are the experimental probability and the theoretical probability of the coin landing heads?

F 0.58 experimental and 0.5 theoretical

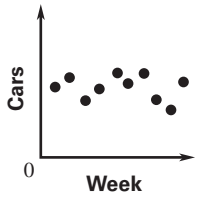
G 0.29 experimental and 0.5 theoretical

H 0.58 experimental and 1.0 theoretical

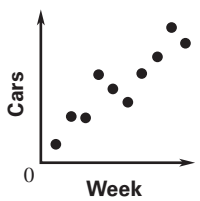
J 0.5 experimental and 0.5 theoretical

47 Marcus collected data on the number of cars that pass his house during 10 weeks. He saw no relationship between the week and the number of cars. Which scatterplot most likely represents his data?

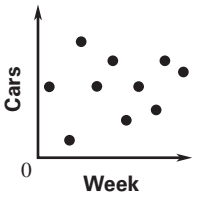
A



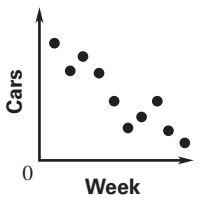
C



B



D



48 Simplify the radical expression.

$2\sqrt{9} + 5\sqrt[3]{64}$

F -34

G 26

H 46

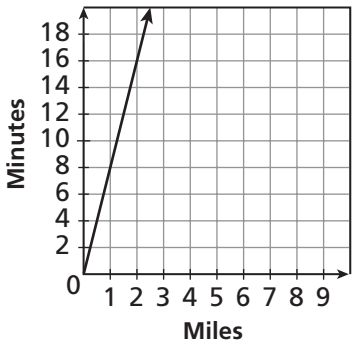
J 240

GO ON

Name _____ Date _____

Pre Test (continued)

49 The graph below shows information relating to a person's running speed. At what rate does the athlete run?



A 1 min/mi

B 2 min/mi

C 4 min/mi

D 8 min/mi

50 Which of the following relations is a function?

F {(−5, 5), (0, 3), (0, −5), (5, 4)}

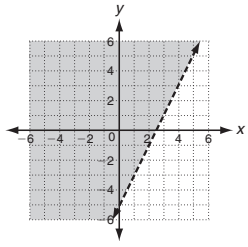
G {(3, 4), (3, 5), (3, 6), (3, 7)}

H {(−2, 1), (0, 1), (2, 5), (4, 5)}

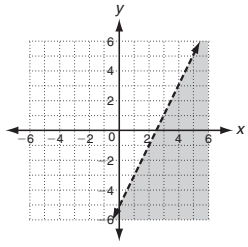
J {(3, 2), (5, 4), (5, 6), (7, 8)}

51 Which is the graph of $y < 2x - 5$?

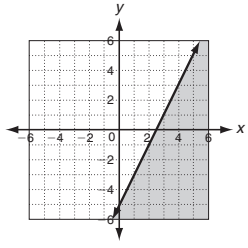
A



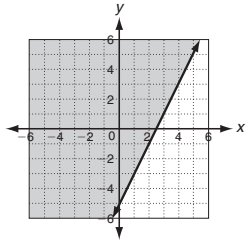
B



C



D



GO ON

Name _____ Date _____

Pre Test (continued)

52 Factor $x^2 - 2x - 15$.

F $(x - 5)(x + 3)$

G $(x + 5)(x - 3)$

H $(x - 15)(x + 1)$

J $(x + 15)(x - 1)$

53 Sal is solving the equation by completing the square.

$ax^2 + bx + c = 0$ (where $a \neq 0$)

Step 1: $ax^2 + bx = -c$

Step 2: $x^2 + \frac{b}{a}x = -\frac{c}{a}$

Step 3: $x^2 + \frac{b}{a}x + \left(\frac{b}{2a}\right)^2 = -\frac{c}{a} + \left(\frac{b}{2a}\right)^2$

Step 4: ?

Which should be Step 4 in the solution?

A $\left(x - \frac{b}{2a}\right)^2 = -\frac{c}{a} + \left(\frac{b}{2a}\right)^2$

B $x^2 + \frac{b}{a}x + \left(\frac{b}{2a}\right)^2 = \left(-\frac{c}{a} + \frac{b}{2a}\right)^2$

C $\left(x - \frac{b}{2a}\right)^2 = \left(-\frac{c}{a} + \frac{b}{2a}\right)^2$

D $\left(x + \frac{b}{2a}\right)^2 = -\frac{c}{a} + \left(\frac{b}{2a}\right)^2$

GO ON

Pre Test (continued)

54 What is the simplified form of this expression?

$(x^2 + 8 - 2x) + (6x^2 + 4x - 3)$

F $7x^2 + 12x - 5x$

G $7x^2 - 5 + 2x$

H $7x^2 + 2x + 5$

J $7x^2 - 2x + 5$

55 An 18-foot ladder is leaning against a building. The bottom of the ladder is 6 feet from the building. To the nearest foot, how high up the building does the ladder meet the wall?

A 12 ft

B 17 ft

C 19 ft

D 288 ft

GO ON

Name _____ Date _____

Pre Test (continued)

56 What is the equation of the line that has a slope of 9 and passes through the point (9, 9)?

F $9x + y + 90 = 0$

G $9x - y + 72 = 0$

H $9x - y - 72 = 0$

J $9x + y - 90 = 0$

57 Find the quotient.

$$\frac{2x^2 + 6x}{x^2 + 4x - 5} \div \frac{4x^3 + 12x^2}{x^2 + 3x - 10}$$

A $\frac{x - 2}{x - 1}$

B $\frac{2x(x - 1)}{x - 2}$

C $\frac{x - 2}{2x(x - 1)}$

D $\frac{2x(x - 2)}{4x^2(x - 1)}$

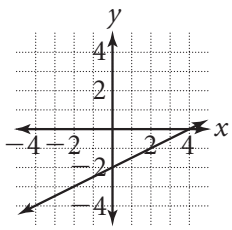
GO ON

Name _____ Date _____

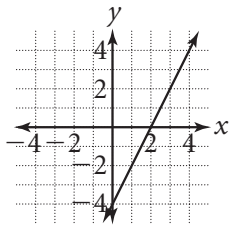
Pre Test (continued)

58 Which graph represents a line that has an x-intercept of -2 and a y-intercept of 4?

F



G



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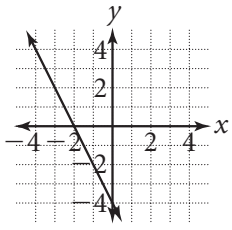

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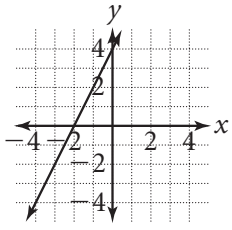
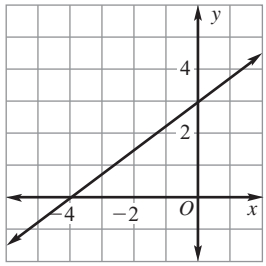


59 Which equation is shown on the graph below?



A $4x + 3y = 12$

B $-3x + 4y = 12$

C $3x + 4y = 9$

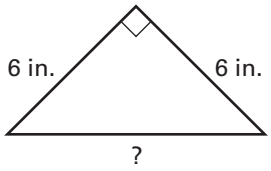
D $-4x + 3y = 9$

GO ON

Name _____ Date _____

Pre Test (continued)

60 Brittany designs a stained-glass window with a right triangle in the center, as shown below.



Which is closest to the length of the triangle's hypotenuse?

F 72.0 in.

G 36.0 in.

H 12.0 in.

J 8.5 in.

61 Simplify $3\sqrt{4} + 6\sqrt{25} - 8\sqrt{121}$.

A -806

B -52

C -3

D 124

GO ON

Name _____ Date _____

Pre Test (continued)

62 Twenty students at a high school were chosen as a representative sample of the school population. Each student was asked how far he or she lives from school, to the nearest half mile. The results of the survey are shown below.

0.5 3.5 1.0 0.0 2.0 1.0 3.0 2.0 1.5 3.0
0.5 2.5 0.0 3.0 0.5 1.5 4.5 2.5 1.5 4.0

Based on the survey results, which is the probability that a randomly chosen student at the school lives more than 2 miles from school?

F 8%

G 16%

H 25%

J 40%

63 $2(x^4 - 2x) - 6(x^4 + 3x) = ?$

A $-4x^4 - 22x$

B $-4x^4 - 14x$

C $4x^4 - 22x$

D $-4x^4 + 22x$

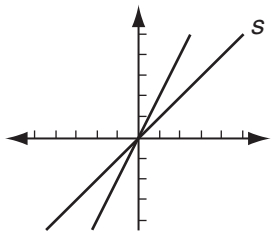
GO ON

Name _____ Date _____

Pre Test (continued)

64 Line s has equation $y = x$. Which diagram contains the graph of the equation $y = 2x$?

F



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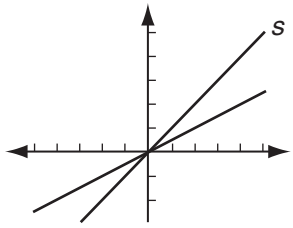

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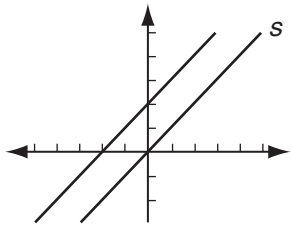

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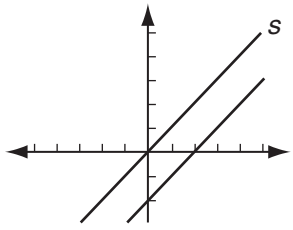


65 What are the solutions of the quadratic equation $15x^2 = 2x + 8$?

A $\frac{4}{5}, \frac{2}{3}$

B $-\frac{2}{3}, -\frac{4}{3}$

C $\frac{4}{5}, -\frac{2}{3}$

D $-\frac{4}{5}, \frac{2}{3}$

Name _____ Date _____

SPI 3102.1.1

Interpret patterns found in sequences, tables, and other forms of quantitative information using variables or function notation.

1 The table shows the cost C of renting rollerblades for h hours.

h	C
1	7.50
2	10.00
3	12.50
4	15.00

Which linear equation shows the cost C of renting rollerblades for h hours?

A $C = 7.50h$

B $C = 2.50 + 5.00h$

C $C = 5.00 + 2.50h$

D $C = 5.00h$

2 A new skyscraper is being built downtown. One story goes up the first week and 2 stories go up each week after that. Each week Todd tries to guess how many stories the building will have when completed. Which equation or inequality best describes the number of stories s Todd might guess after n weeks of construction?

F $s \geq 2n + 1$

G $s \geq 2n - 1$

H $s < 2n - 1$

J $s = 2n$

3 The base pay for a salesperson is $300 per week. The salesperson also earns a 15% commission on sales made. If the salesperson earned a total of $345 in a given week, what was his/her total sales for the week?

A $100

B $200

C $300

D $400

GO ON

Name _____ Date _____

SPI 3102.1.1 (continued)

4 A company starts with two employees. In six months, the company has seven employees. The number of employees increases at a steady rate. Which equation models the relationship between the number of employees n and the number of months m since the company started?

F $n = \frac{6}{5}m + 2$

G $m = 2n + \frac{5}{6}$

H $m = \frac{5}{6}n + 2$

J $n = \frac{5}{6}m + 2$

5 Which equation can be used to generate the values in the table?

x	*y*
−2	3
1	−3
3	−7
5	−11

A $y = -2x - 1$

B $y = -2x + 1$

C $y = 2x - 1$

D $y = x^2 - 1$

6 The table shows the amount of money A Amy earns for babysitting h hours.

h	*A*
1	8.00
2.5	20.00
3	24.00
5.5	44.00

Which linear equation shows the amount earned A for babysitting h hours?

F $A = 12h$

G $A = 4.00 + 12.00h$

H $A = 8h$

J $A = 4.00 + 8.00h$

GO ON

Name _____ Date _____

SPI 3102.1.2

Write an equation symbolically to express a contextual problem.

1 Which best represents the following?

An angle measure m is 37 more than x.

A $m = 37 + x$

B $m = 37 - x$

C $m = 37x$

D $x = 37m$

2 Anna has $35. She spends $4 for lunch each day. Which equation shows how many dollars s Anna still has after d days?

F $s = 35 + 4d$

G $s = 35 - 4d$

H $d = 35 - 4s$

J $s = 4 + 35d$

3 Four less than a number n is equal to eight more than triple the number n. Which equation can be used to find the number n?

A $n - 4 = 3 + 8n$

B $n - 4 = 8 + 3n$

C $4 - n = 8 + 3n$

D $4 - n = 8 + \frac{1}{3}n$

GO ON

Name _____ Date _____

SPI 3102.1.2 (continued)

4 The amount A that the Hernandez family spends in n weeks for groceries at a local food club includes $45 for the initial registration fee and $37 each week for a box of groceries. Which equation describes the relationship between A and n?

F $A = 45(n + 37)$

G $A = 45n + 37$

H $A = 37n + 45$

J $A = 37(n + 45)$

5 Rod opens a savings account and puts $225 in the account. He will put $50 in the account each month afterwards. Assume that Rod does not withdraw any money from the account. Which equation best describes the total amount s that Rod has deposited after exactly m months?

A $s = 50m + 225$

B $m = 50 + 225s$

C $m = 50s + 225$

D $s = 225m + 50$

6 The base of a hill is 75 feet below sea level. A path up the hill rises 2 feet for every 7 feet of horizontal distance it gains. Which equation shows the relationship between the elevation above sea level E at any point on the path and the horizontal distance d of the point from the base of the hill?

F $E = \frac{7}{2}d - 75$

G $E = \frac{7}{2}d + 75$

H $E = \frac{2}{7}d + 75$

J $E = \frac{2}{7}d - 75$

GO ON

Name _____ Date _____

SPI 3102.1.3

Apply properties to evaluate expressions, simplify expressions, and justify solutions to problems.

1 Evaluate $\frac{5x - 2}{10}$ for $x = 10$.

A 3

B 4

C 4.8

D 5.2

2 What is the simplified expression for $15(4a - 7) - 2(3a - 3)$?

F $66a - 99$

G $54a - 99$

H $54a - 111$

J $66a - 99$

3 Which property of real numbers justifies the statement $(3n + 5n) + 7 = 7 + (3n + 5n)$?

A associative property of addition

B distributive property

C commutative property of addition

D associative property of multiplication

GO ON

Name _____ Date _____

SPI 3102.1.3 (continued)

4 The expression $\sqrt{20}$ is equivalent to

F $2\sqrt{5}$

G $5\sqrt{2}$

H $4\sqrt{5}$

J 10

5 If $x = 3^2 \cdot 4^{1/3}$, then $x^3 = ?$

A $3^6 \cdot 4$

B $3^5 \cdot 4$

C $3^5 \cdot 3$

D $3 \cdot 4$

6 Simplify $\frac{1}{2}x - \frac{2}{3}(3x - 6)$.

F $\frac{5}{2}x + 4$

G $-\frac{3}{2}x + 4$

H $-\frac{3}{2}x - 4$

J $\frac{5}{2}x - 4$

GO ON

Name _____ Date _____

SPI 3102.1.3 (continued)

7 Which equation is equivalent to $2(x + 1) + 4(x - 3) = 12$?

A $6x - 10 = 12$

B $6x + 13 = 12$

C $6x + 14 = 12$

D $-2x + 14 = 12$

8 Which statement can be justified using the distributive property?

F The cost of 4 bagels and 4 bottles of juice is equal to the 4 times the cost of one bagel and one bottle of juice.

G The cost of 4 bagels and 4 bottles of juice is equal to the cost of 4 bottles of juice and 4 bagels.

H The cost of 4 bagels, 4 bottles of juice, and 4 tubs of peanut butter is equal to the cost of 4 tubs of peanut butter, 4 bottles of juice, and 4 bagels.

J The cost of 4 bagels and 4 bottles of juice is equal to the cost of one bottle of juice and one bagel plus $4.

9 Four students simplified the expression $9(n + 4) + 4(3 + n) - 3(4 + n)$. Which student simplified the expression correctly?

Student	Simplified Expression
Amber	$14n + 13$
Gloria	$16n + 36$
Liam	$10n + 13$
Josh	$10n + 36$

A Amber

B Gloria

C Liam

D Josh

GO ON

Name _____ Date _____

SPI 3102.1.3 (continued)

10 If $a = 2x^2$ and $b = 3x^4$, then $a^3 + b^2 = ?$

F $2x^5 + 3x^6$

G $8x^5 + 9x^6$

H $2x^6 + 3x^8$

J $8x^6 + 9x^8$

11 Which expression is equivalent to $4(g + 6) + 5(7 + g) - 2(6 + g)$?

A $7g + 42$

B $10g + 47$

C $7g + 47$

D $10g + 51$

12 Which of the following is an example of the power of a power property?

F $x^2 \cdot x^3 = x^5$

G $(x^2)^3 = x^6$

H $x^2 + 3x^2 = 4x^2$

J $\frac{x^4}{x^5} = x^{-1}$

GO ON

Name _____ Date _____

SPI 3102.1.4

Translate between representations of functions that depict real-world situations.

1 Sasha puts $150 into a savings account that earns 4% simple interest. She wants to know how long it will take to earn $18 in interest. Which equation should Sasha use?

A $I = 150 \cdot 0.04 \cdot 18$

B $18 = 150 \cdot 0.04 \cdot t$

C $18 = 150 \cdot 0.4 \cdot t$

D $I = 150 \cdot 0.4 \cdot 18$

2 A soup can has a surface area of 25π in^2. If the radius of the can is 2.5 in, what is the height of the can?

F 0.2 in.

G 5 in.

H 10 in.

J 20 in.

3 If the volume of a basketball is 2144.66 in^3, which equation should you use to find the radius of the basketball?

A $2144.66 = \frac{4\pi r^3}{3}$

B $r = \frac{4\pi}{2144.66}$

C $2144.66 = \frac{4\pi r^2}{2}$

D $r = \frac{4 \cdot \pi \cdot 2144.66}{3}$

GO ON

Name _____ Date _____

SPI 3102.1.4 (continued)

4 A video store charges \$3 to rent a video game. It costs you \$5 per month to operate your video game player. Which function rule describes this situation? Let $C(v)$ represent the total cost, and let v represent the number of videos you rent.

F $C(v) = 5 + 3v$

G $C(v) = 5 \cdot 3v$

H $C(v) = 3 + 5v$

J $C(v) = 3 \cdot 5v$

5 A soup can has a surface area of 25π in^2. The radius of the can is 2.5 in. Which equation should you use to find the height of the can?

A $2.5\pi = 2 \cdot \pi \cdot 25(25 + h)$

B $25\pi = 2 \cdot \pi \cdot 2.5(2.5 + h)$

C $25\pi = 2 \cdot \pi \cdot 2.5(2.5 - h)$

D $25\pi = 4 \cdot \pi \cdot 2.5(2.5 + h)$

6 A student band spent \$100 producing audio tapes of a recent performance. The band plans to sell the tapes for \$5.50. Which function describes this situation? Let $P(t)$ represent the band's profit and let t represent the number of tapes sold.

F $P(t) = 5.5t + 100$

G $P(t) = 5.5t - 100$

H $P(t) = 5.5 - 100t$

J $P(t) = 55t - 100$

GO ON

Name _____ Date _____

SPI 3102.1.5

Recognize and express the effect of changing constants and/or coefficients in problem solving.

1 Suppose the equation of the linear function $y = 2x - 3$ is changed to $y = 2x - 6$. How does this change the y-value for a given x-value?

A The y-value increases by 3.

B The y-value is two times greater.

C The y-value does not change.

D The y-value decreases by 3.

2 What happens to the graph of $y = x - 3$ when the slope is divided by 2?

F The new line is half as steep.

G The new line is twice as steep.

H The graph is 2 units higher for every value of x.

J The graph is 2 units lower for every value of x.

3 Which line has the steepest slope?

A $y = 3x + 5$

B $y = x - 8$

C $y = -x + 10$

D $y = -6x - 4$

GO ON

Name _____ Date _____

SPI 3102.1.5 (continued)

4 The function $y = x^2 + 4$ is obtained by translating $g(x)$ three units down. Which equation describes $g(x)$?

F $y = x^2 + 7$

G $y = x^2 + 1$

H $y = x^2 - 1$

J $y = x^2 - 7$

5 How does the graph of $y = 0.75x - 4$ change when the y-intercept is increased by 0.25?

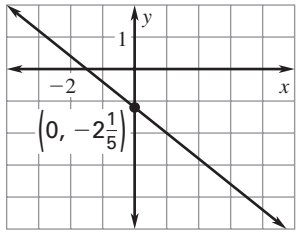
A The slope becomes 1.

B The line becomes less steep.

C The graph is 0.25 unit higher for every value of x.

D The graph is 0.25 unit lower for every value of x.

6 The graph of $y = -\frac{4}{5}x - 2\frac{1}{5}$ is shown. Which point will lie on the graph if the slope of the line is tripled and the y-intercept is increased by 1?



F $\left(-2, 3\frac{3}{5}\right)$

G $\left(0, -3\frac{1}{5}\right)$

H $(1, 3)$

J $(2, -4)$

GO ON

Name _____ Date _____

SPI 3102.1.5 (continued)

7 The function $g(x)$ is obtained by translating $f(x) = x^2 + 4$ two units down. Which equation describes $g(x)$?

A $y = x^2 - 2$

B $y = x^2$

C $y = x^2 + 2$

D $y = 2 - x^2$

8 What happens to the graph of $y = 6$ when the equation is changed to $y = -2$?

F The line moves down 2 units.

G The line moves down 8 units.

H The y-intercept changes from 6 to 4.

J The line moves to the left 2 units.

9 How does multiplying the slope by -1 change the graph of $y = -x + 1$?

A The line then rises from left to right.

B The line then falls from left to right.

C The y-intercept becomes -1.

D The y-coordinate is 1 unit less for every value of x.

GO ON

Name _____ Date _____

SPI 3102.1.5 (continued)

10 What happens to the y-intercept of the graph of the equation $y = x$ when the equation is changed to $y = x - 2$?

F The y-intercept does not change.

G The y-intercept changes from 0 to -2.

H The y-intercept changes from 0 to 2.

J The y-intercept becomes equal to the x-intercept.

11 Which function describes the graph of $y = |x|$ translated 3 units to the left and 1 unit down?

A $y = |x - 3| - 1$

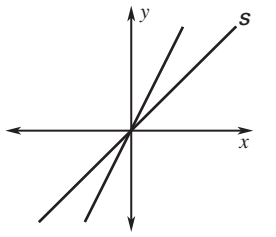
B $y = |x + 1| - 3$

C $y = -|x + 3| - 1$

D $y = |x + 3| - 1$

12 Line s has the equation $y = x$. Which diagram also contains the graph of the equation $y = -4x$?

F



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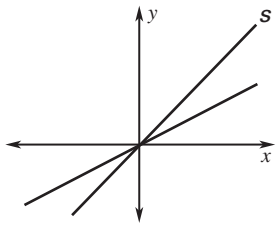

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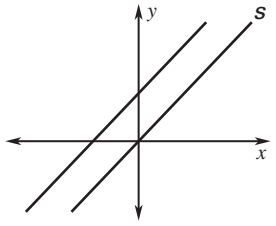

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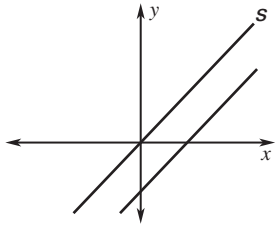


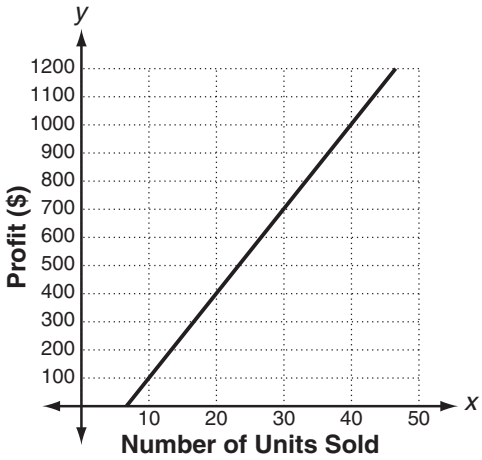
GO ON

Name _____ Date _____

SPI 3102.1.6

Determine and interpret slope in multiple contexts including rate of change in real-world problems.

1 The graph below shows data about profit and number of units of a product sold.



Which is a correct interpretation of the slope of the graph?

A The profit is increasing at the rate of $10 per 100 units sold.

B The profit is increasing at the rate of $40 per 1000 units sold.

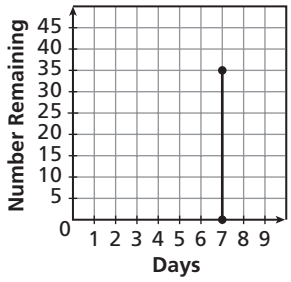
C The profit is increasing at the rate of $30 per unit sold.

D The profit is increasing at the rate of $1000 per unit sold.

2 An electronics store held daily drawings to give away 35 flash drives. The store gave away an equal number of flash drives each day until they were all gone.

Which graph represents this situation?

F



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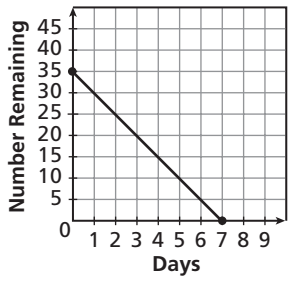

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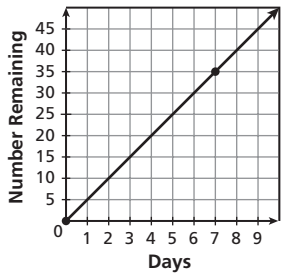

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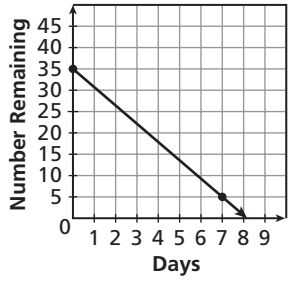


GO ON

Name _____ Date _____

SPI 3102.1.6 (continued)

3 Julie released a balloon from 5 ft above the ground. The height of the balloon is equal to the balloon's rate of ascension multiplied by the time elapsed. After 10 minutes, the balloon is 205 feet above the ground. What is the balloon's rate of change in height with respect to time?

A 0.05 ft/min

B 20 ft/min

C 20.5 ft/min

D 2000 ft/min

4 Santiago is renting a car for his vacation. The car costs $32 per day plus an additional amount per mile driven. Santiago rented the car for 3 days and drove 318 miles, and his total bill was $172.32. If this information were represented in a graph, what would the slope of the line represent?

F The rental car cost is increasing at a rate of $0.24 for each mile driven.

G The rental car cost is increasing at a rate of $0.44 for each mile driven.

H The rental car cost is increasing at a rate of $0.84 for each mile driven.

J The rental car cost is increasing at a rate of $5.11 for each mile driven.

5 The table below shows the height of a candle after different amounts of time have gone by. What is the candle's rate of change in height with respect to time?

Time (minutes)	Height (inches)
0	12
12	11
48	8
108	3

A 0.08 in./min

B 3 in./min

C 12 in./min

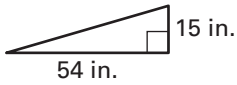
D 40 in./min

GO ON

Name _____ Date _____

SPI 3102.1.6 (continued)

6 A skate park ramp is represented by the triangle below. What is the slope of the ramp? Round your answer to the nearest tenth.



F 3.6

G 1.9

H 0.3

J 0.2

7 Raoul's Internet bill for last month was $20.18. His Internet provider charges $12.98 per month for a modem and an additional amount for each minute of time Raoul is online. Last month, Raoul was online for 2 hours. What is the Internet services rate of change in cost with respect to online time?

A $0.06/min

B $0.12/min

C $0.28/min

D $3.60/min

8 Andrew rode his bike to the store, which is 7 miles from his house. It took him half an hour roundtrip. If this information were represented in a graph, what would the slope of the line represent?

F Andrew is riding at a rate of 23 miles per hour.

G Andrew is riding at a rate of 3.5 miles per hour.

H Andrew is riding at a rate of 14 miles per hour.

J Andrew is riding at a rate of 210 miles per hour.

GO ON

Name _____ Date _____

SPI 3102.1.6 (continued)

9 Batya waits tables for her summer job. She earns an hourly wage plus her tips. Last week she worked 40 hours and earned $292.50. If Batya made $42.50 in tips, what is the rate of change in wages with respect to hours worked?

A $0.17/h

B $2.50/h

C $6.25/h

D $7.31/h

10 Travis belongs to a gym. He pays his entire year's membership in one bill. This includes $8 each month for a locker and a monthly fee. If his yearly bill is $456.00, what is the monthly fee?

F $4.75

G $30.00

H $37.33

J $360.00

GO ON

Name _____ Date _____

SPI 3102.2.1

Operate (add, subtract, multiply, divide, simplify, powers) with radicals and radical expressions including radicands involving rational numbers and algebraic expressions.

1 What is the simplified form of this expression?

$$\frac{\sqrt{64}}{\sqrt{16}}$$

A $\frac{1}{4}$

B $\frac{1}{2}$

C 2

D 4

2 What is the product $\sqrt{9x^7} \cdot \sqrt{42xy^5}$ in simplest form?

F $\sqrt{378x^8y^5}$

G $x^4y^2\sqrt{51y}$

H $3x^4y^2\sqrt{42y}$

J $2x^4y^2\sqrt{94y}$

3 $9\sqrt{81} - 81\sqrt{9} = ?$

A 0

B $72\sqrt{72}$

C $-72\sqrt{72}$

D -162

GO ON

Name _____ Date _____

SPI 3102.2.1 (continued)

4 $(3\sqrt{21})^2 - 3\sqrt{16} = ?$

F 168

G 177

H 189

J 207

5 Simplify $3\sqrt{4} + 6\sqrt{25} - 8\sqrt{121}$.

A -806

B -52

C -3

D 124

6 Simplify the radical expression.

$\sqrt{16} - \sqrt[3]{27}$

F -5

G -1

H 1

J 5

GO ON

Name _____ Date _____

SPI 3102.2.1 (continued)

7 What is the simplified form of $\sqrt{121x^5y^2z^3}$?

A $11x^2yz$

B $11\sqrt{x^5y^2z^3}$

C $11x^2yz\sqrt{xz}$

D $11x^4y^2z^2\sqrt{xz}$

8 The expression $\sqrt{20}$ is equivalent to

F $2\sqrt{5}$

G $5\sqrt{2}$

H $4\sqrt{5}$

J 10

9 Divide and simplify $\frac{\sqrt[3]{216a^7b^3}}{\sqrt[3]{2a^2b}}$.

A $6a^2b\sqrt{3}$

B $36a^2b^{-1}$

C $\sqrt[3]{108a^5b^2}$

D $3a\sqrt[3]{4a^2b^2}$

GO ON

Name _____ Date _____

SPI 3102.2.1 (continued)

10 Multiply and simplify $\sqrt[3]{9} \cdot \sqrt[3]{-81}$.

F -9

G -243

H $\sqrt[3]{-72}$

J $-2\sqrt[3]{9}$

11 What is the sum of $\sqrt{25x^4} + \sqrt{x^6}$?

A $5x^5$

B $25x^{10}$

C $5x + x^2$

D $5x^2 + x^3$

12 Divide and simplify $\frac{\sqrt{600}}{\sqrt{6}}$.

F 10

G 50

H 100

J $3\sqrt{66}$

GO ON

Name _____ Date _____

SPI 3102.2.2

Multiply, divide, and square numbers expressed in scientific notation.

1 What is the product of $(4.2 \times 10^3)\,(2 \times 10^{-8})$?

A 8.4×10^{11}

B 4.4×10^{-5}

C 8.4×10^{-5}

D 8.4×10^{11}

2 Divide $\frac{7.1 \times 10^3}{9.5 \times 10^{-2}}$. Write your answer in scientific notation.

F 7.5×10^{-7}

G 7.5

H 7.5×10^4

J 0.75×10^5

3 If 1 light year is 5.88×10^{12} miles, how many miles is 15 light years? Write your answer in scientific notation.

A 88.2×10^{12} mi

B 8.82×10^{13} mi

C 5.88×10^{27} mi

D 5.88×10^{180} mi

GO ON

Name _____ Date _____

SPI 3102.2.2 (continued)

4 A grain of rice weighs (on average) 2×10^{-4} grams. How many grams do 3.5×10^{8} grains of rice weigh?

F 3.7×10^{-32} g

G 5.5×10^{4} g

H 7×10^{4} g

J 7×10^{12} g

5 Greendale Park is rectangular-shaped and has an area of 13.94×10^{6} square feet. If the width of the park is 2.64×10^{3} feet, what is the length of the park?

A 5.28×10^{2} ft

B 5.28×10^{3} ft

C 11.3×10^{2} ft

D 11.3×10^{3} ft

6 The speed of sound in dry air is 3.43×10^{2} m/sec. What is the speed of sound cubed?

F 3.43×10^{5} m/s

G 3.43×10^{6} m/s

H 1.03×10^{7} m/s

J 4.04×10^{7} m/s

GO ON

Name _____ Date _____

SPI 3102.2.3

Describe and/or order a given set of real numbers including both rational and irrational numbers.

1 Which of the following has the least value?

A $\frac{1}{2}$

B $\frac{2}{3}$

C $\frac{3}{10}$

D 0.2

2 Which of the following values is greater than 0.37?

F $\frac{1}{3}$

G $\frac{2}{5}$

H $\frac{1}{10}$

J $\frac{3}{100}$

3 The numbers $\frac{4}{7}$, 0.6, $\frac{3}{4}$ are listed from least to greatest. Which of the following should come next?

A $\frac{1}{2}$

B $\frac{2}{3}$

C $\frac{9}{10}$

D $\frac{13}{21}$

GO ON

Name _____ Date _____

SPI 3102.2.3 (continued)

4 One leg of a right triangle measures 16 units and the hypotenuse measures 30 units. Which type of number best describes the length of the other leg of the triangle?

F integer
G irrational number
H rational number
J whole number

5 Gina, Leroy, Samer, and Inez were sharing a pizza. The table below shows how much pizza each received. Who had the most pizza?

Friend	Pizza
Gina	$\frac{1}{6}$
Leroy	0.33
Samer	0.42
Inez	$\frac{1}{12}$

A Inez
B Gina
C Leroy
D Samer

6 Which list is shown in order from least to greatest?

F $\frac{3}{4}, \frac{2}{3}, 0.5$
G $\frac{2}{5}, \frac{1}{8}, 0.92$
H $0.13, \frac{1}{4}, 0.47$
J $-\frac{1}{2}, -0.6, -\frac{5}{6}$

GO ON

Name _____ Date _____

SPI 3102.2.3 (continued)

7 Which value below is the greatest?

A $\frac{5}{8}$

B $\frac{3}{5}$

C $\frac{17}{23}$

D $-\frac{9}{10}$

8 Which of the following falls between −0.73 and −0.29?

F $-\frac{4}{5}$

G $-\frac{1}{8}$

H $-\frac{3}{7}$

J $\frac{9}{25}$

9 Raylene had a bag of apples. She gave $\frac{6}{13}$ of the apples to Griffin, 0.18 to Nicole, 0.32 to Lance, and $\frac{1}{8}$ to Maya. Who received the fewest apples?

A Maya

B Lance

C Griffin

D Nicole

GO ON

Name _____ Date _____

SPI 3102.2.3 (continued)

10 Which shows the numbers -3.5, -4.60, and $-3\frac{1}{4}$ in order from greatest to least?

F $-4.60, -3\frac{1}{4}, -3.5$

G $-3\frac{1}{4}, -3.5, -4.60$

H $-3\frac{1}{4}, -4.60, -3.5$

J $-4.60, -3.5, -3\frac{1}{4}$

11 Which of the following does not fall between 0.32 and $\frac{3}{7}$?

A $\frac{1}{3}$

B $\frac{5}{9}$

C $\frac{20}{47}$

D 0.41

12 Which of the following best describes this set of numbers?

$$\frac{3}{8}, 0.375, \frac{9}{24}, \frac{18}{48}$$

F The set of numbers is in random order.

G Each value in the set of numbers is the same.

H The set of numbers is in order from least to greatest.

J The set of numbers is in order from greatest to least.

GO ON

Name _____ Date _____

SPI 3102.3.1

Express a generalization of a pattern in various representations including algebraic and function notation.

1 Paul, Cam, and Liz wrote expressions that will generate integers that are 1 more than a multiple of 3. Eric's expression does not generate these values. Which expression is Eric's if n is a positive integer?

A $3n + 4$

B $4n + 1$

C $6n + 4$

D $3n + 1$

2 The first four **triangular** numbers are shown below.

What is the next triangular number?

F 15

G 17

H 20

J 50

3 Which expression describes the sequence 4, 7, 12, 19, 28, . . . for positive integer n?

A $n^2 + 3$

B $2n^2 + 2$

C $n + 1$

D $3n + 1$

GO ON

Name _____ Date _____

SPI 3102.3.1 (continued)

4 What algebraic expression describes the sequence 7, 11, 15, 19, 23?

F $4n$

G $n + 4$

H $3n + 4$

J $4n + 3$

5 Which tells how to find successive terms of the sequence 4, 5, 7, 10, 14, . . . ?

A Multiply the previous term by 2 and subtract 3.

B Add the term number to the value of the term to get the next term.

C Add 3 to the term number.

D Square the term number and add 3.

6 In the chart below, Robi has indicated the number of triangles that can be drawn from one vertex of each polygon. How many triangles can be drawn from one vertex of a 12-sided polygon?

Number of sides in the polygon	Number of triangles
4	2
5	3
6	4
7	5

F 8

G 10

H 12

J 14

GO ON

Name _____ Date _____

SPI 3102.3.2

Operate with polynomials and simplify results.

1 Simplify $(2x^2 - 3x + 4) + (x^2 + x + 1)$.

A $3x^2 + 2x + 5$

B $2x^2 + 2x + 5$

C $3x^2 - 2x + 5$

D $2x^2 - 2x + 5$

2 Which expression is equivalent to $(y - 9)(2y + 3)$?

F $2y^2 - 15y - 27$

G $2y^2 + 15y - 27$

H $2y^2 + 3y - 27$

J $2y^2 - 27$

3 Simplify $(9a^2 + 3a - 1) - (a^2 + 3a + 1)$.

A $8a^2 - 2$

B $8a^2 + 6a$

C $9a^2 - 2$

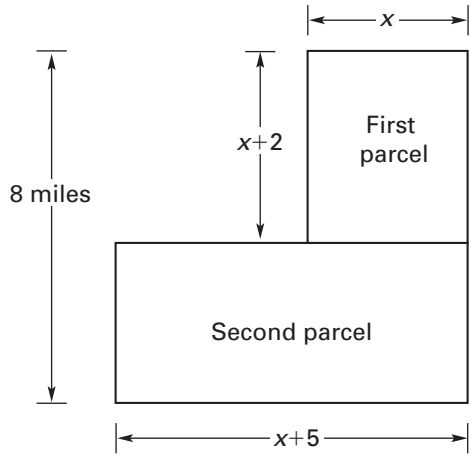
D $9a^2 + 6a$

GO ON

Name _____ Date _____

SPI 3102.3.2 (continued)

4 Ravi buys a second parcel of land for his avocado farm as shown below.



Which of the following expressions gives the area of *both* parcels?

F $3x + 30$ square miles

G $8x + 40$ square miles

H $x^2 + 2x$ square miles

J $2x^2 - 3x + 30$ square miles

5 $\frac{2x^2 - 7x + 4}{x^5} = ?$

A $2x^3 - 7x^4 + 4x^5$

B $\frac{2}{x^3} - \frac{7}{x^4} + \frac{4}{x^5}$

C $\frac{2}{x^3} - \frac{7}{x^4} + 4$

D $\frac{2}{x^3} - \frac{3}{x^5}$

6 Simplify $(x^2 - 7) + (x^3 + 2)$.

F $x^5 - 5$

G $2x^5 - 5$

H $x^6 - 5$

J $x^3 + x^2 - 5$

GO ON

Name _____ Date _____

SPI 3102.3.2 (continued)

7 $2x^3 - 4x^2 - (6x^2 + 3x^3) = ?$

A $-4x^3 - 7x^2$

B $-x^3 - x^2$

C $-5x^2$

D $-x^3 - 10x^2$

8 Which expression is equivalent to $(3v - 1)(v^2 + v - 1)$?

F $3v^3 + 2v^2 - 4v - 1$

G $3v^3 + 2v^2 - 4v + 1$

H $3v^3 + 3v^2 - 3v - 1$

J $3v^3 + 3v^2 - 3v + 1$

9 Which of the following expressions is equivalent to $(-4x - 2y) + (-7x - 3y)$?

A $-11x - y$

B $-11x - 5y$

C $-11x + y$

D $-11x + 5y$

GO ON

Name _____ Date _____

SPI 3102.3.2 (continued)

10 Simplify.

$$\frac{4x^5 - 10x^3 + 20x^2 - 5x}{6x}$$

F $\frac{2}{3}x^5 - \frac{5}{3}x^2 + \frac{10}{3}x - \frac{5}{6}$

G $\frac{2}{3}x^5 - \frac{5}{3}x^2 + \frac{10}{3}x$

H $\frac{2}{3}x^4 - \frac{5}{3}x^2 + \frac{10}{3}x - \frac{5}{6}$

J $\frac{2}{3}x^4 - \frac{5}{3}x^2 + \frac{10}{3}x$

11 Which expression is equivalent to $x(3x - 1)(2x^2 + 1)$?

A $6x^3 - 2x^2 - x + 3$

B $6x^4 - 2x^3 + 3x^2 - x$

C $6x^3 - 2x^3 + 4x - 1$

D $6x^4 - 2x^3 - x + 3$

12 What expression is equivalent to $(4x + 2y - 5) - 4(2y + 1)$?

F $4x - 6y + 4$

G $4x - 6y - 9$

H $4x - 16y + 4$

J $4x - 16y - 9$

GO ON

Name _____ Date _____

SPI 3102.3.3

Factor polynomials

1 Which is a factor of $x^2 - 9$?

A $x + 6$

B $x - 3$

C $x - 9$

D $x^2 + 3$

2 Which is a factor of $-4x^2 + 24x - 36$?

F $4x + 3$

G $4x - 3$

H $x + 3$

J $x - 3$

3 What is the factored form of $1 - 6x + 9x^2$?

A $(1 - 3x)(1 + 3x)$

B $(3x - 1)(3x + 1)$

C $(1 - 3x)^2$

D $(3x + 1)^2$

GO ON

Name _____ Date _____

SPI 3102.3.3 (continued)

4 Factor $(w^2 + 20w + 36)$ completely.

F $(w + 6)^2$

G $(w + 4)(w + 9)$

H $(w + 3)(w + 12)$

J $(w + 2)(w + 18)$

5 What is the greatest common factor of the terms of $-16x^3 + 8x^2 - 36x$?

A $3x$

B $4x$

C $6x$

D $8x$

6 Factor $(16r^2 - 81)$ completely.

F $(4r - 9)^2$

G $(4r - 9)(4r + 9)$

H $(2r - 9)(8r + 9)$

J $(2r - 9)(8r - 9)$

GO ON

Name _____ Date _____

SPI 3102.3.4

Operate with, evaluate, and simplify rational expressions including determining restrictions on the domain of the variables.

1 Simplify $\frac{x-4}{x^2-2x-8}$.

A $\frac{1}{x-2}$

B $\frac{1}{x+4}$

C $\frac{1}{x+2}$

D 0

2 Which of the following rational expressions is equivalent to $\frac{4}{x+1}+\frac{2x-1}{x}$?

F $\frac{2x^2+12x+1}{x^2+x}$

G $\frac{2x^2+5x-1}{x^2+x}$

H $\frac{2x^2+5x}{x^2+x}$

J $\frac{2x^2+5x-1}{x^2+1}$

3 Which expression is equivalent to the product?

$$\frac{x^2-1}{x^2+2x}\cdot\frac{x^2-x-6}{x^2-2x-3}$$

A $\frac{x+2}{x-1}$

B $\frac{2x+1}{x}$

C $\frac{x-1}{x+1}$

D $\frac{x-1}{x}$

GO ON

Name _____ Date _____

SPI 3102.3.4 (continued)

4 Which term is not in the numerator of the simplified version of the sum?

$$\frac{x+1}{x-3} + \frac{2x^2+5x+2}{x^2-2x-3}$$

F $7x$

G $3x^2$

H 3

J $5x$

5 Which of the following values of x is not a restricted value when simplifying $\frac{x^2-9}{25-4x^2} \div \frac{x^2-3x}{5+3x-2x^2}$?

A $-\frac{5}{2}$

B $\frac{5}{2}$

C 0

D 1

6 What is $\frac{ab^2c^3}{a^3bc - ab^3c}$ written in simplest form?

F $\frac{c^2}{ab(a-b)(a+b)}$

G $\frac{abc}{(a-b)(a+b)}$

H $\frac{bc^2}{(a-b)(a+b)}$

J $\frac{a}{bc(a-b)(a+b)}$

GO ON

Name _____ Date _____

SPI 3102.3.4 (continued)

7 $\frac{4}{x} + \frac{2 - x}{x + 2} = ?$

A $\frac{x^2 + 6x + 8}{x^2 + 2x}$

B $\frac{-x^2 + 6x + 8}{x^2 + 2x}$

C $\frac{x^2 + 6x}{x^2 + 2x}$

D $\frac{-x^2 + 6x}{x^2 + 2x}$

8 Which of the following rational expressions is written in simplest form?

F $\frac{4y^2 - 9x^2}{4y^2 - 6xy}$

G $\frac{x}{x^3 - 2x^2 + x}$

H $\frac{x}{x^2 - 2x + 1}$

J $\frac{a^2 + b^2}{3a^3 + 3ab^2}$

9 When multiplying $\left(\frac{3x^2 - x - 2}{x - 4}\right)\left(\frac{x^2 - 16}{x^2 + x - 2}\right)$, what are the restrictions on the variable x?

A $x \neq 4, 1, -2$

B $x \neq -4, -1, 2$

C $x \neq -\frac{2}{3}, 1, 16$

D $x \neq \frac{2}{3}, -1, -16$

GO ON

Name _____ Date _____

SPI 3102.3.4 (continued)

10 Which of the following is a restricted value of a when finding the sum $\frac{2a+1}{a-5} + \frac{a+5}{2a-1}$?

F -5

G $-\frac{1}{2}$

H 0

J 5

11 Which of the following is equivalent to the rational expression below?

$$\frac{4x^2 - 81y^2}{8x^3 - 36x^2y}$$

A $\frac{1}{4x^2}$

B $\frac{2x - 9y}{4x^2}$

C $\frac{2x + 9y}{4x^2}$

D $-\frac{1}{4x^2}$

12 $\frac{2x-5}{x+1} - \frac{x-3}{3x+1} = ?$

F $\frac{5x^2 - 19x - 2}{3x^2 + 4x + 1}$

G $\frac{6x^2 - 9x + 8}{3x^2 + 4x + 1}$

H $\frac{5x^2 - 11x - 2}{3x^2 + 4x + 1}$

J $\frac{5x^2 - 9x - 8}{x^2 + 4x + 1}$

GO ON

Name _____ Date _____

SPI 3102.3.5

Write and/or solve linear equations, inequalities, and compound inequalities including those containing absolute value.

1 Solve for x.

$$|x - 3| = 5$$

A $x = -8$ or $x = 2$

B $x = -2$ or $x = 8$

C $x = -2$ or $x = 2$

D $x = -8$ or $x = 8$

2 What is the solution set of $3\left|\frac{4}{3} - y\right| = 7$?

F $\left\{-1, \frac{11}{3}\right\}$

G $\left\{-\frac{1}{3}, 1\right\}$

H $\{-1, 1\}$

J $\left\{-\frac{11}{3}, \frac{11}{3}\right\}$

3 Solve for y.

$$|2 - 3y| + 4 = 7$$

A $y = \frac{1}{3}$ or $y = \frac{5}{3}$

B $y = -\frac{1}{3}$ or $y = \frac{5}{3}$

C $y = -\frac{1}{3}$ or $y = \frac{1}{3}$

D $y = \frac{1}{3}$ or $y = -\frac{5}{3}$

4 What is the solution set of $|4 - y| - 3 < 8$?

F $\{y : y < 15\}$

G $\{y : -7 > y > 15\}$

H $\{y : y > -7\}$

J $\{y : -7 < y < 15\}$

GO ON

Name _____ Date _____

SPI 3102.3.5 (continued)

5 What is the solution set of $|x + 2| > \frac{1}{2}$?

A $\left\{x : -\frac{5}{2} < x < \frac{3}{2}\right\}$

B $\left\{x : x < -\frac{3}{2} \text{ or } x > \frac{5}{2}\right\}$

C $\left\{x : x < -\frac{5}{2} \text{ or } x > -\frac{3}{2}\right\}$

D $\left\{x : \frac{3}{2} < x < \frac{5}{2}\right\}$

6 What is the solution set of $\frac{1}{3}|x - 5| - \frac{4}{3} \geq 1$?

F $\{x : x \leq -12 \text{ or } x \geq 12\}$

G $\{x : x \leq -2 \text{ or } x \geq 12\}$

H $\{x : x \leq 2 \text{ or } x \geq 12\}$

J $\{x : x \leq -2 \text{ or } x \geq 2\}$

7 Which inequality is equivalent to $4(x - 1) > 3 - 5x$?

A $9x > 7$

B $9x > 4$

C $x > 7$

D $x < -7$

GO ON

Name _____ Date _____

SPI 3102.3.5 (continued)

8 Solve $\frac{1}{2}x = \frac{2}{3}(3x - 6)$.

F $x = 4$

G $x = \frac{8}{3}$

H $x = \frac{12}{5}$

J $x = \frac{8}{5}$

9 Solve $2y - 3 \leq 7(4 - y)$.

A $y \leq \frac{31}{9}$

B $y \leq 31$

C $y \leq \frac{14}{9}$

D $y \leq 14$

10 The surface area of a rectangular shipping container must be less than 44 square feet. The formula for surface area S is $S = 2h + 2l + 2w$, where h, l, and w are the height, length, and width, respectively, of the container's edges. Which inequality describes the container's width if the length is 1 foot less than the width and the height is 2 feet more than the width?

F $w < 7$ feet

G $w < 8$ feet

H $w < 9$ feet

J $w < 14$ feet

GO ON

Name _____ Date _____

SPI 3102.3.5 (continued)

11 Solve $-15 \leq 5(3x - 2) < 20$.

F $-\frac{1}{3} \leq x < 2$

G $-\frac{1}{3} \leq x < \frac{1}{2}$

H $-\frac{1}{3} \geq x < 2$

J $-3 \leq x < 2$

12 The quantity a is always less than $\frac{3}{4}$ of the sum of another quantity b and 10. Which equation or inequality represents this relationship?

F $a < \frac{3}{4}(b + 10)$

G $a < \frac{3}{4}b + 10$

H $b > \frac{3}{4}(a + 10)$

J $a = \frac{3}{4}(b - 10)$

13 Jared's weight in pounds j is 12 less than twice Sheila's weight. Sheila weighs s pounds. Which equation or inequality describes this relationship?

A $j < 2s - 12$

B $j < 2s + 12$

C $j = 2(s - 12)$

D $j = 2s - 12$

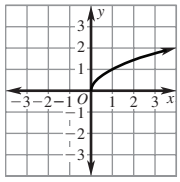
GO ON

Name _____ Date _____

SPI 3102.3.6

Interpret various relations in multiple representations.

1 Which equation represents the graph below?



A $y = x^2$

B $y = \sqrt{x}$

C $y = |x|$

D $y = \frac{1}{2}x$

2 Which is the best description of the graph of $y = x^2$?

F a straight line that begins in quadrant III and ends in quadrant I

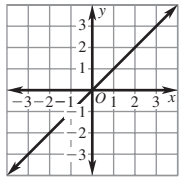
G a curved graph that opens upward, goes through the origin, and is symmetric about the y-axis

H a straight line that is symmetric about the y-axis

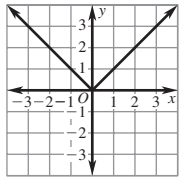
J a curved graph that goes through the origin and is symmetric about the x-axis

3 Which graph represents $y = -x$?

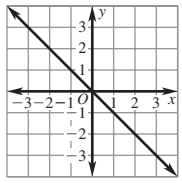
A



B



C



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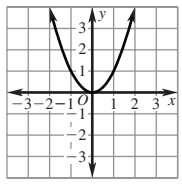


GO ON

Name _____ Date _____

SPI 3102.3.6 (continued)

4 The graph of which equation below is not symmetric in either the x-axis or the y-axis?

F $y = \sqrt{x}$

G $y = -x^2$

H $y = 4x^2$

J $y = |x|$

5 Which situation can be represented by a quadratic function?

A the path of an arrow shot into the air

B the value of a car over 10 years

C the time t it takes to travel a distance d at a constant speed

D the amount of water that comes out of a faucet during a set period of time

6 Which graph models a linear function?

A a V-shaped graph with a vertex at (0, 0)

B a parabola that opens up and has a vertex at (0, 0)

C a parabola that opens down and has a vertex at (0, 0)

D a line that passes through (0, 0)

7 Which is <u>not</u> true about the equation $y = |x|$?

F It represents a function.

G Its graph is symmetric about the x-axis.

H Its graph contains the origin.

J Every domain value and its opposite both have the same range value.

GO ON

Name _____ Date _____

SPI 3102.3.7

Determine domain and range of a relation, determine whether a relation is a function and/or evaluate a function at a specified rational value.

1 Which statement below correctly justifies whether the table below represents a function?

Input	5	−3	6	−3	6
Output	−1	6	−5	5	−8

A Yes, because each output occurs exactly once.

B No, because each output occurs exactly once.

C Yes, because exactly one input is repeated.

D No, because one input is paired with two outputs.

2 Which of the following is <u>not</u> in the domain of the set?

{(8, −4), (1, 1), (−2, 8), (0, 0)}

F −4

G −2

H 0

J 1 and 0

3 When the input is 6, what is the output?

{(5, −1), (−3, 6), (6, −5), (6, −8)}

A 5

B −5 or −3

C −3

D −8 or −5

4 Which statement below correctly justifies whether or not the table below represents a function?

Input	8	−9	2	−2	1	0
Output	−4	1	−2	1	0	0

F Yes, because each input occurs exactly once.

G Yes, because each ordered pair occurs once.

H No, because one output is repeated.

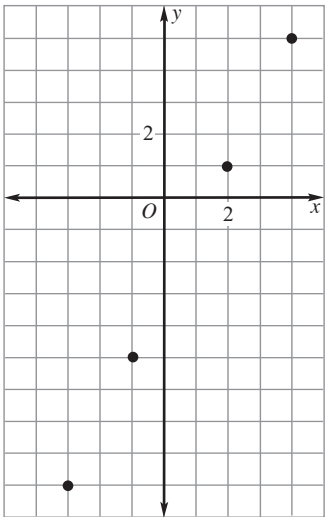
J No, because one input and output are the same.

GO ON

Name _____ Date _____

SPI 3102.3.7 (continued)

5 What is the domain of the function graphed below?



A $\{2, 4\}$

B $\{-3, -1, 2, 4\}$

C $\{-9, -5, -3, 1, 5\}$

D $\{1, 5\}$

6 What is the range of $y = x^2$ when $x = -5, -4, 0, 3,$ and 4?

F $\{0, 9, 16, 25\}$

G $\{2, 3\}$

H $\{-25, -16, 0, 9, 16\}$

J $\{-5, -4, 0, 2, 3\}$

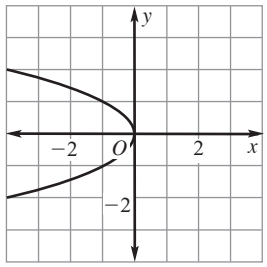
7 Which of the following numbers is <u>not</u> in the range of $y = -x^2 + 2$?

A -4 **C** 2

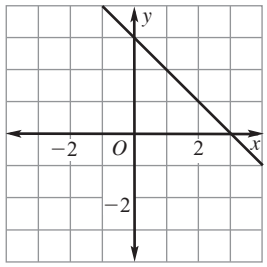
B 0 **D** 4

8 Which of the following graphs represents a function?

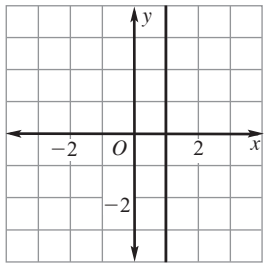
F



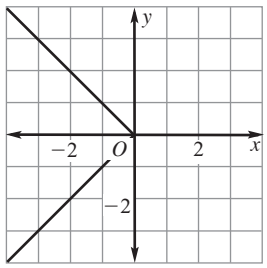
G



H



J



GO ON

Name _____ Date _____

SPI 3102.3.7 (continued)

9 If a vertical line intersects a graph more than once, which of the following is true?

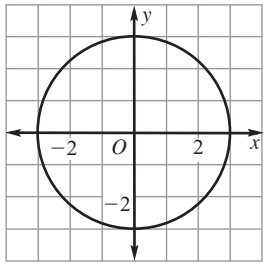
A The relation represented by the graph is a function.

B The relation represented by the graph is not a function.

C The graph does not represent a relation.

D None of the above.

10 Which of the following does not support the conclusion that the graph below is not a function?



F The vertical line $x = -2$ intersects the graph twice.

G The vertical line $x = 2$ intersects the graph more than once.

H The vertical line $x = 3$ intersects the graph once.

J The vertical line $x = 0$ intersects the graph at (0, 3) and (0, −3).

11 Which of the following relations is a function?

A {(−4, 16), (−2, 4), (0, 0), (−4, 4)}

B {(−4, 16), (−2, 4), (0, 0), (−2, −4)}

C {(−4, 16), (−2, 4), (−4, 0), (2, 4)}

D {(−4, 16), (−2, 4), (0, 0), (2, 4)}

12 Which of following is not in the domain of the set?

Input	5	−3	6	−5	6
Output	−3	6	−3	4	−8

F −8

G −3

H 5

J 6

GO ON

Name _____ Date _____

SPI 3102.3.7 (continued)

13 Which of the following is not a function?

A {(2, 6), (−4, 5), (−2, −2)}

B {(6, −6), (5, −3), (−3, −2)}

C {(−5, 2), (−4, 6), (−5, −3)}

D {(−6, 12), (5, −1), (6, −2)}

14 The table shows Delaney's pay for various numbers of hours worked. What is the range of the function?

Hours worked	6	12	18	24
Pay (dollars)	42	84	126	168

F {6, 12, 18, 24}

G {42, 84, 126, 168}

H {6, 24}

J {42, 168}

15 Which set of ordered pairs is generated by the function $y = 2x + 1$ when the domain is {3, −6, 5}?

A {(7, 3), (−11, −6), (11, 5)}

B {(3, 7), (−6, −11), (5, 11)}

C {(3, 6), (−6, −10), (5, 10)}

D {(7, 4), (−11, −5), (11, 6)}

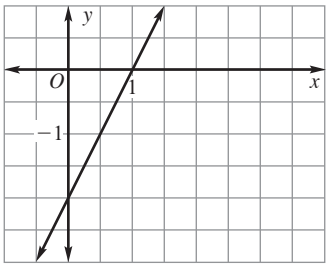
GO ON

Name _____ Date _____

SPI 3102.3.8

Determine the equation of a line and/or graph a linear equation.

1 Which equation is shown on the graph below?



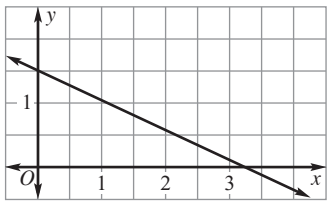
A $y = 2x + 1$

B $y = \frac{1}{2}x - 2$

C $y = \frac{1}{2}x + 1$

D $y = 2x - 2$

2 Which equation is shown on the graph below?



F $-12x - 26y = 39$

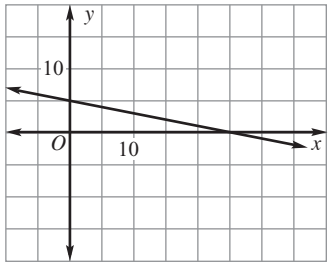
G $12x + 26y = 39$

H $26x + 12y = 39$

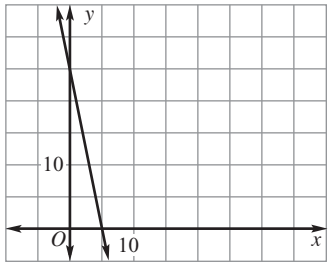
J $26x - 12y = 39$

3 Which of the following is the graph of $y = -\frac{1}{5}x + 5$?

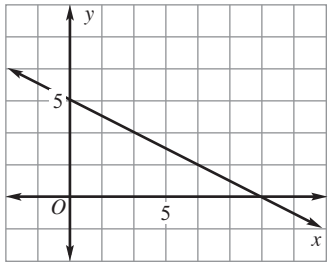
A



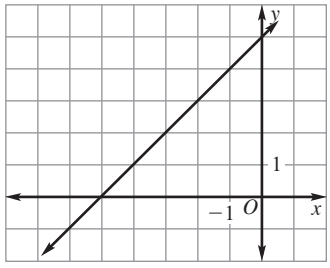
B



C



D



GO ON

Name _____ Date _____

SPI 3102.3.8 (continued)

4 What is the equation of the line that has a slope of -2 and passes through the point $(-5, 0)$?

F $2x + y = -10$

G $-2x + y = 10$

H $2x + y = 7$

J $2x + y = -7$

5 What is the equation of the line that passes through the points in the table?

x	*y*
-4	1
0	3
1	3.5

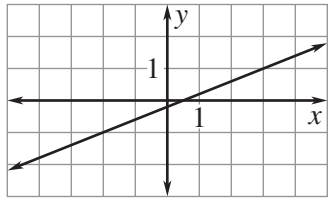
A $y = x + 5$

B $y = x + 3$

C $y = \frac{1}{2}x + 3$

D $y = 2x + 3$

6 Which equation represents this graph?



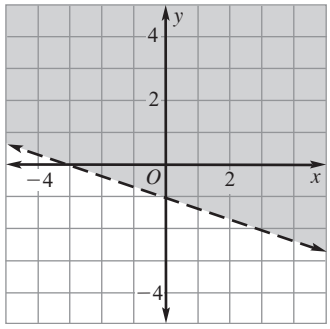
F $2x - 5y = -1$

G $2x + 5y = -1$

H $-2x + 5y = -1$

J $2x + 5y = 1$

7 Which inequality is shown on the graph below?



A $3x + y > -3$

B $x - y < 3$

C $x + 3y > -3$

D $-x - 3y < 3$

GO ON

Name _____ Date _____

SPI 3102.3.9

Solve systems of linear equations/inequalities in two variables.

1 What is the solution of the system $7x - 2y = 5$ and $-3x - 4y = 7$?

A $\left(\frac{3}{17}, -\frac{32}{17}\right)$

B $\left(-\frac{3}{17}, -\frac{32}{17}\right)$

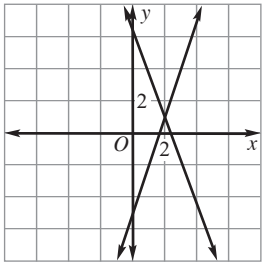
C $\left(\frac{3}{17}, \frac{32}{17}\right)$

D $\left(-\frac{3}{17}, \frac{32}{17}\right)$

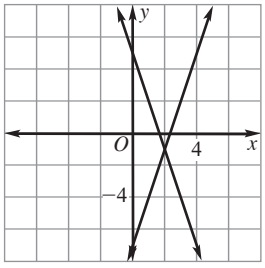
2 Which graph represents the system of equations shown below?

$$y = -3x - 5$$
$$y = 3x + 7$$

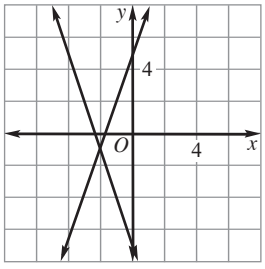
F



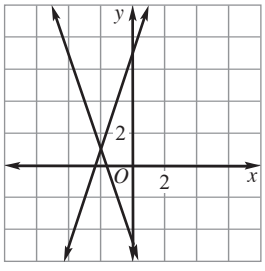
G



H



J



3 Marla bought 2 sandwiches and a drink for $13.90. Adam spent $21.85 on 3 sandwiches and 2 drinks. Let s be the cost of a sandwich and let d be the cost of a drink. Which system of equations represents this situation?

A $2s + d = 13.90$
$3s + 2d = 21.85$

B $2s + 3d = 21.85$
$d + 2d = 13.90$

C $2d + s = 21.85$
$3d + 2s = 13.90$

D $s + 2d = 7.95$
$2s + 3d = 35.75$

4 What is the solution of the system shown below?

$$5x + y = 3$$
$$\frac{1}{2}y = \frac{3}{2} - \frac{5}{2}x$$

F infinitely many solutions

G $(2, -7)$

H $(1, -2)$

J no solution

GO ON

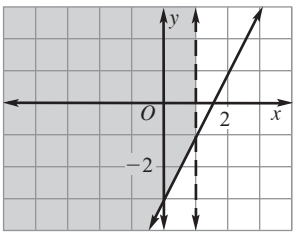
Name _____ Date _____

SPI 3102.3.9 (continued)

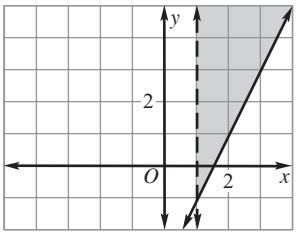
5 Which graph best represents the solution to the system shown below?

$$2x - y \leq 3$$
$$x > 1$$

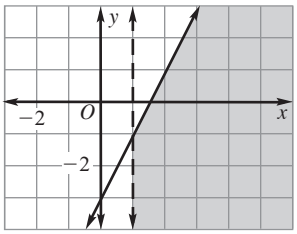
A



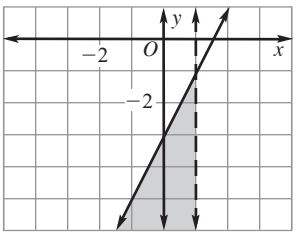
B



C



D



6 What is the solution of the system shown below?

$$x - 11y = -123$$
$$11x - y = -33$$

F $(-11, 1)$

G $(11, -1)$

H $(-12, -1)$

J $(-2, 11)$

7 The school cafeteria sells a hamburger meal for \$5 and a vegetarian burger meal for \$4. On Tuesday the cafeteria sold 3 more hamburger meals than vegetarian burger meals. The income from these sales was \$357. Which system of equations models the number of hamburger meals h and the number of vegetarian burger meals v sold?

A $5h + 4v = 357$
$v = h + 3$

B $5h + 4v = 3$
$h = v + 357$

C $4h + 5v = 357$
$h = v - 3$

D $5h + 4v = 357$
$h = v + 3$

GO ON

Name _____ Date _____

SPI 3102.3.10

Find the solution of a quadratic equation and/or zeros of a quadratic function.

1 Solve $3 + 5x - 2x^2 = 0$ by factoring.

A $x = -\frac{1}{2}$ or $x = 3$

B $x = \frac{1}{2}$ or $x = 3$

C $x = -\frac{1}{2}$ or $x = -3$

D $x = \frac{1}{2}$ or $x = -3$

2 If $4x$ is subtracted from x^2, the difference is 12. Which of the following could be the value of x?

F 2

G 4

H -6

J -2

3 What is the solution set of $4x^2 - 25 = 0$?

A $\left\{-\frac{2}{5}, \frac{2}{5}\right\}$

B $\{-2, 5\}$

C $\left\{-\frac{5}{2}, \frac{5}{2}\right\}$

D $\{2, -5\}$

4 Solve $2x^2 + 8x = -8$ by completing the square.

F $x = \pm 2$

G $x = 4$

H $x = 0$ or 2

J $x = -2$

GO ON

Name _____ Date _____

SPI 3102.3.10 (continued)

5 Solve $x^3 + x^2 - 2x = 0$ by factoring.

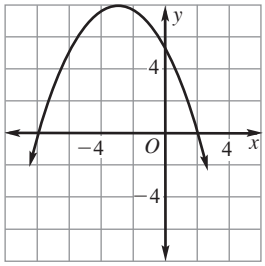
A $x = -2$ or $x = 1$

B $x = -2$, $x = 0$, or $x = 1$

C $x = 2$, $x = 0$, or $x = -1$

D $x = 2$ or $x = -1$

6 Which could be the equation for the graph below?



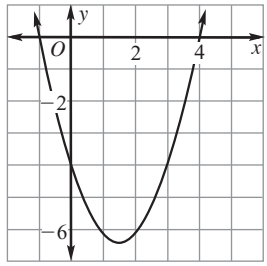
F $y = a(x + 2)(x - 8)$

G $y = a(x + 2)(x + 8)$

H $y = a(x - 2)(x - 8)$

J $y = a(x - 2)(x + 8)$

7 What are the zeros of the function whose graph is shown?



A -1 only

B -4 only

C -1 and 4

D 1 and -4

8 Solve $3x^2 - 24x = 6$ using the quadratic formula.

F 6, 3

G $4 \pm 3\sqrt{2}$

H $2 \pm \sqrt{3}$

J 3, -6

GO ON

Name _____ Date _____

SPI 3102.3.11

Analyze nonlinear graphs including quadratic and exponential functions that model a contextual situation.

1 A baseball is thrown upward with an initial velocity of 48 feet per second. The height (in feet) of the ball above the ground after t seconds is given by the formula $s = -16t^2 + 48t$. After how many seconds is the ball 20 feet above the ground?

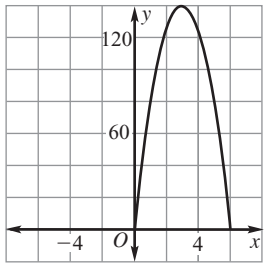
A 1 sec

B $\frac{1}{2}$ sec and $2\frac{1}{2}$ sec

C 1 sec and 2 sec

D $1\frac{1}{2}$ sec and $3\frac{1}{2}$ sec

2 The graph below shows the height as a function of time of a ball thrown into the air at 96 feet per second. Which of the following is a valid conclusion based on the graph?



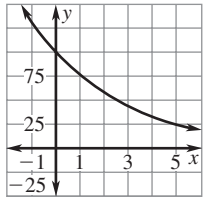
F The ball hits the ground after six seconds.

G The ball hits the ground after three seconds.

H Any ball thrown into the air hits the ground after six seconds.

J Any ball thrown into the air hits the ground after three seconds.

3 Which model best represents the decay curve for a population of 100 sea turtles that is decreasing at a rate of 24% per year?



A $y = 100(-0.24)^t$

B $y = 100(-0.76)^t$

C $y = 100(0.76)^t$

D $y = 100(1.24)^t$

GO ON

Name _____ Date _____

SPI 3102.3.11 (continued)

4 A competitor dives from a 3-meter springboard. The diver's altitude y at horizontal distance x can be modeled by the function $y = -2.2x^2 + 5.3x + 4$. The altitude and distance are both in meters. What is the diver's maximum altitude? Round your answer to the nearest tenth.

F 1.2 m

G 3 m

H 4 m

J 7.2 m

5 The polynomial $-16t^2 + 32t + 8$ models the height (in feet) of a ball tossed into the air after t seconds. What is the maximum height of the ball?

A 1 ft

B 2.2 ft

C 18 ft

D 24 ft

6 In 1999, the world's population was about 6 billion and growing at a rate of 1.4%. Which exponential function models this situation?

F $y = 6{,}000{,}000{,}000 + 1.4x$

G $y = 1.4(6{,}000{,}000{,}000)^x$

H $y = 6{,}000{,}000{,}000(1.4)^x$

J $y = 6{,}000{,}000{,}000(1.014)^x$

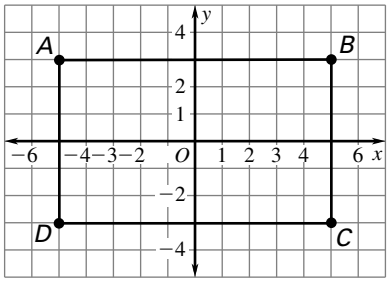
GO ON

Name _____ Date _____

SPI 3102.4.1

Develop and apply strategies to estimate the area of any shape on a plane grid.

1 What is the area of the rectangle *ABCD*?



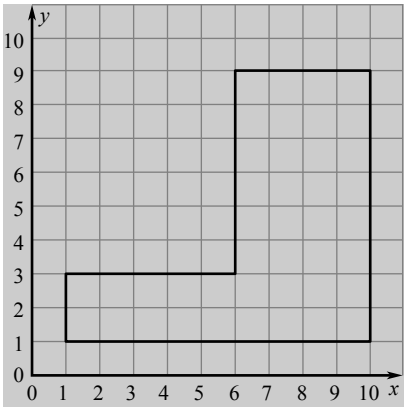
A 50 units^2

B 25 units^2

C 64 units^2

D 60 units^2

2 What is the area of the shape below?



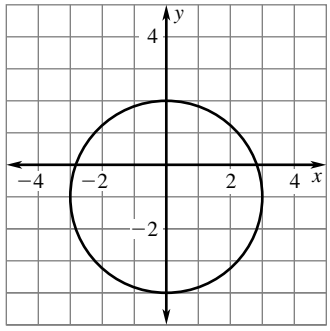
F 48 units^2

G 42 units^2

H 34 units^2

J 37 units^2

3 The circle in the graph has a diameter of 6 units. Which of the following is the best estimate for the area of the figure?



A $\approx$ 28 units^2

B $\approx$ 9 units^2

C $\approx$ 19 units^2

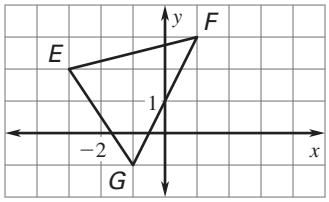
D $\approx$ 113 units^2

GO ON

Name _____ Date _____

SPI 3102.4.1 (continued)

4 Which of the following is the best estimate of the area of triangle *EFG*?



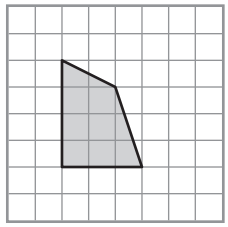
F about 20 units^2

G about 3 units^2

H about 7 units^2

J about 15 units^2

5 Which of the following is the best estimate of the area of the shape below?



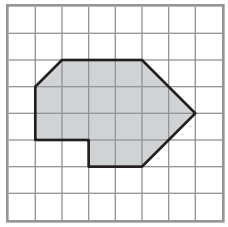
A 7.4 units^2

B 6.5 units^2

C 9.3 units^2

D 8.5 units^2

6 What is the area of the shape below?



F 17.5 units^2

G 15 units^2

H 18 units^2

J 13.5 units^2

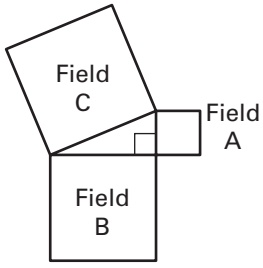
GO ON

Name _____ Date _____

SPI 3102.4.2

Solve contextual problems using the Pythagorean Theorem.

1 The drawing below shows a lot shaped like a right triangle surrounded by three square fields. If the perimeter of Field A is 40 meters, and the perimeter of Field B is 96 meters, what is the perimeter of Field C?



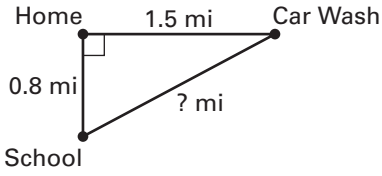
A 56 m

B 104 m

C 136 m

D 152 m

2 The diagram shows the path Brandon walks from his home to school to the car wash where he works part-time after school.



To the nearest tenth of a mile, how far does he walk from school to the car wash?

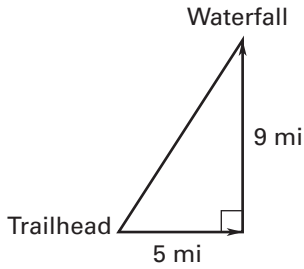
F 1.5 mi

G 1.6 mi

H 1.7 mi

J 2.0 mi

3 Michael leaves a trailhead and hikes 5 miles east and 9 miles north to a waterfall.



Which is closest to the straight-line distance from the trailhead to the waterfall?

A 7.0 mi

B 7.5 mi

C 10.3 mi

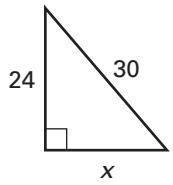
D 14.0 mi

GO ON

Name _____ Date _____

SPI 3102.4.2 (continued)

4 Anthony is using the Pythagorean Theorem to find the length of the missing side below.



Which equation should Anthony use?

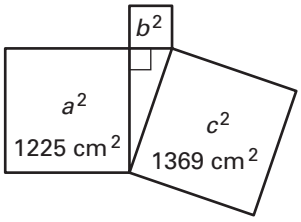
F $24^2 + x^2 = 30^2$

G $24 + x = 30$

H $24^2 + 30^2 = x^2$

J $30^2 + x^2 = 24^2$

5 The model below demonstrates the Pythagorean Theorem. What is the area of b^2?



A 144 cm^2

B 289 cm^2

C 441 cm^2

D 2594 cm^2

6 Each equal side of an isosceles right triangle is 4 feet long. Find the length of the hypotenuse.

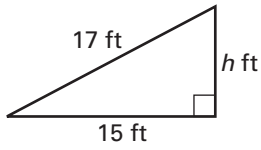
F $2\sqrt{2}$ feet

G 32 feet

H $4\sqrt{2}$ feet

J 16 feet

7 The bottom end of a skateboard ramp is 15 feet from the side of a building. The length of the ramp is 17 feet. What is the height from the ground to the top of the ramp?



A 12 ft

B 8 ft

C 6 ft

D 24 ft

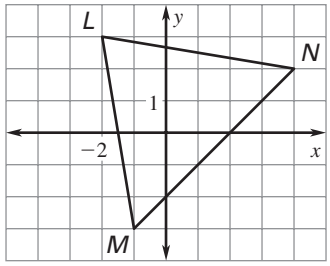
GO ON

Name _____ Date _____

SPI 3102.4.3

Solve problems involving the distance between points or midpoint of a segment.

Use the graph below to answer questions 1–3.



1 What is the midpoint of $\overline{LM}$?

A $\left(-\frac{3}{2}, 0\right)$

B $\left(-\frac{3}{4}, 0\right)$

C $\left(0, -\frac{3}{2}\right)$

D $\left(0, -\frac{3}{4}\right)$

2 What is the midpoint of $\overline{LN}$?

F $\left(\frac{5}{2}, 1\right)$

G $\left(-3, 2\frac{1}{2}\right)$

H $\left(1, \frac{5}{2}\right)$

J $\left(\frac{5}{2}, 2\frac{1}{4}\right)$

3 To the nearest hundredth of a unit, what is the length of the segment joining the midpoints of $\overline{LM}$ and $\overline{LN}$?

A 5.34

B 3.54

C 4.57

D 3.75

GO ON

Name _____ Date _____

SPI 3102.4.3 (continued)

4 Find the coordinates of the other endpoint of a segment with endpoint $X(-1, 5)$ and midpoint $M(4, -3)$.

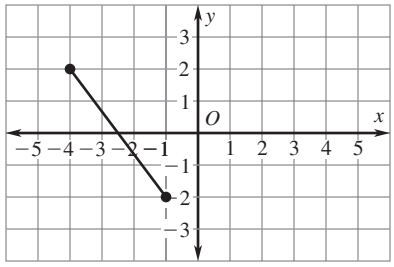
F $(8, -11)$

G $(9, -11)$

H $(11, -9)$

J $(10, -11)$

5 What is the length of the segment shown below?



A 2.5 units

B 5 units

C 5.6 units

D 4 units

6 Find the midpoint of a line segment with endpoints $X(6, -3)$ and $Y(7, 5)$.

F $(6, 1)$

G $\left(1, -\frac{13}{2}\right)$

H $\left(6\frac{1}{2}, 1\right)$

J $\left(-\frac{5}{2}, 3\right)$

GO ON

Name _____ Date _____

SPI 3102.4.4

Convert rates and measurements.

1 A waterfall falls at a rate of 40,000 gallons of water per hour. How many gallons will fall in one year at this rate?

A 6.6×10^3 gal

B 4.0×10^8 gal

C 3.5×10^2 gal

D 3.5×10^8 gal

2 During a workout, an athlete's heart beats 31 times in 15 seconds. What is the athlete's heart rate in beats per minute?

F 124 beats/minute

G 131 beats/minute

H 186 beats/minute

J 112 beats/minute

3 A new shoot of bamboo has grown 42 inches in its first week of growth. At this rate, how tall will the plant be after 75 days?

A 28.8 ft

B 12 ft

C 37.5 ft

D 121 ft

4 Chris rides his beach cruiser 3 miles in 22 minutes. If he continues to bike at this rate, about how far will he bike in half an hour?

F 3.6 mi

G 4.1 mi

H 4.6 mi

J 3.9 mi

GO ON

Name _____ Date _____

SPI 3102.4.4 (continued)

5 A market sells $2\frac{1}{2}$ pounds of fresh fish for \$14.95. How much would it cost to buy $1\frac{1}{4}$ pounds of fish at the same price per pound?

A \$7.48

B \$5.98

C \$13.46

D \$4.78

6 A surfboard shaper repaired 8 surfboards in 5 hours. At this rate, how many surfboards can the shaper expect to repair in five 7-hour days?

F 40 boards

G 35 boards

H 56 boards

J 65 boards

7 One mile equals 5280 feet. Leopards can run up to 70 miles an hour. If a leopard runs at a speed of 60 miles per hour, what is the leopard's speed in feet per second?

A 72 ft/s

B 88 ft/s

C 84 ft/s

D 68 ft/s

8 Patrick has a saltwater hot tub that holds 980 liters of water. If there are 35 grams of salt in a liter of seawater, how many kilograms of salt are in the hot tub?

F 3.43 kg

G 34.30 kg

H 343 kg

J 34300 kg

GO ON

Name _____ Date _____

SPI 3102.5.1

Interpret displays of data to answer questions about the data set(s) (e.g., identify patterns, trends, and/or outliers in a data set).

1 What is(are) the outlier(s) of the following set of numbers?

1.9, 2.4, 3.1, 3.2, 5.2, 3.2, 2.1, 2.0, 2.4, 4.1, 2.6, 2.6

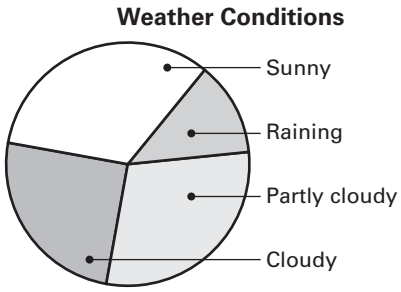
F 1.9

G 5.2

H 1.9 and 5.2

J There is no outlier.

2 According to the graph below, what is the best estimate of the number of days that are partly cloudy?



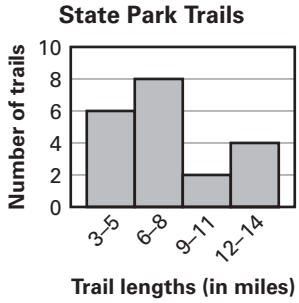
A about 67%

B about 50%

C about 33%

D about 20%

3 According to the graph below, what percent of the trails are between 3 and 5 miles long?



F 27%

G 30%

H 70%

J 75%

GO ON

Name _____ Date _____

SPI 3102.5.1 (continued)

4 The data set below lists the time it took for some students to complete an assignment.

123	142	101	95	112
286	137	148	104	101
93	25	132	150	117
113	132	103	118	162

What are the outliers of the data set?

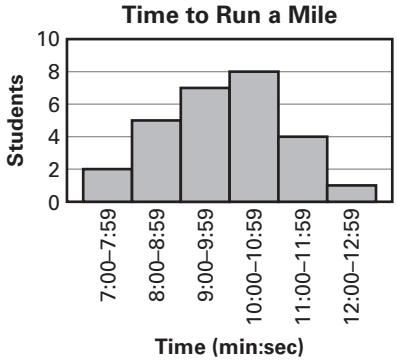
A 25

B 104 and 101

C 25 and 286

D 162

5 Which of the following claims is <u>not</u> supported by the data?



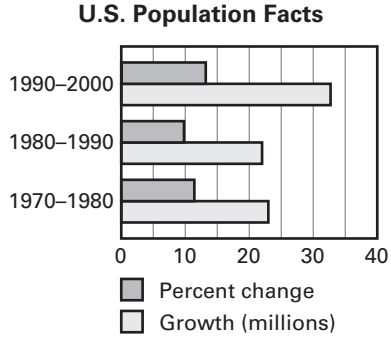
F One student ran the mile in 12 minutes or more.

G The fastest student ran the mile in 7 minutes and 30 seconds.

H Only two students ran the mile in less than 8 minutes.

J Most students ran the mile in less than 11 minutes.

6 Using the graph about U.S. population growth, which statement best describes the relationship between the population growth and the percent of change?



A The greatest percent change was in the period of greatest population growth.

B The highest population growth was from 1980 to 1990.

C 1970 to 1980 had the lowest percent change in its population.

D The population growth from 1990 to 2000 is the highest increase in American history.

GO ON

Name _____ Date _____

SPI 3102.5.2

Identify the effect on mean, median, mode, and range when values in the data set are changed.

1 A crop of sunflower seeds grows to the following heights in a span of three weeks:

25 cm 30 cm 30 cm
30 cm 33 cm 40 cm 55 cm

How will the range of these heights change if another plant grew 35 cm?

A The range will increase.

B The range will stay the same.

C The range will decrease.

D The range will double.

2 A teacher tracked the students' grades for the last math quiz. The grades were: 100, 98, 96, 76, 88, 90, 56, and 76.

How would the mean change if another student scores 100% on the quiz?

F The mean would not change.

G The mean would decrease.

H The mean would increase.

J The mean would be the same as the range.

3 Suhil took note of how long it took her to walk her dog each morning. For the first six days of the week, her times were as follows:

26 minutes, 30 minutes, 35 minutes, 25 minutes, 20 minutes, 27 minutes

Suppose on the seventh day of the week, it took Suhil 35 minutes to walk the dog. How would this change the mean?

A The mean would decrease.

B The mean would not change.

C The mean would increase.

D The mean would be the same as the range.

4 Excluding an outlier <u>never</u> affects the

F mean.

G median.

H mode.

J range.

GO ON

Name _____ Date _____

SPI 3102.5.2 (continued)

5 What effect does excluding an outlier have on the median?

A It increases the median.

B It decreases the median.

C It does not affect the median.

D It depends on the data set.

6 A data set with one outlier has a mean of 120, median of 125, mode of 128, and range of 78. The outlier is 500. What effect does excluding the outlier have on the mean?

F It increases the mean.

G It decreases the mean.

H It does not affect the mean.

J The effect cannot be determined.

7 Ivar tests one new joystick each month for a video game company. The amount he made each month for the last 11 months is listed below.

$135, $145, $125, $135, $185, $105

$175, $175, $145, $175, $175

How will the range be affected if Ivar makes $145 dollars this month?

A The range will not be affected.

B The range will increase.

C The range will decrease.

D The effect cannot be determined.

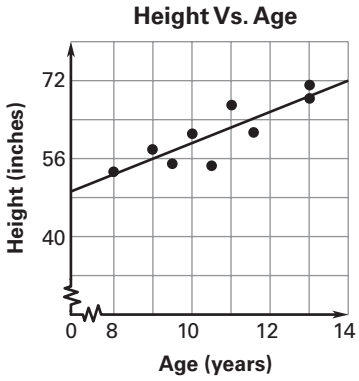
GO ON

Name _____ Date _____

SPI 3102.5.3

Using a scatter-plot, determine if a linear relationship exists and describe the association between variables.

1 If the trend in the graph were to continue, about how tall would you expect a 16-year-old to be?



A 59 inches

B 72 inches

C 75 inches

D 78 inches

2 The points below represent the number of hours spent studying per week and the numerical grade on a mid-term test. Which type of graph would you use to see whether there is a correlation between the hours studied and the test grade?

Hours	18	22	12	13	20	21	25
Grade	84	83	68	71	89	82	94

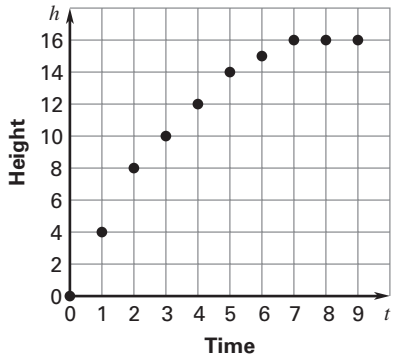
F scatter plot

G histogram

H circle graph

J box-and-whisker plot

3 What is the correlation between height and time in the graph below?



A positive

B negative

C no correlation

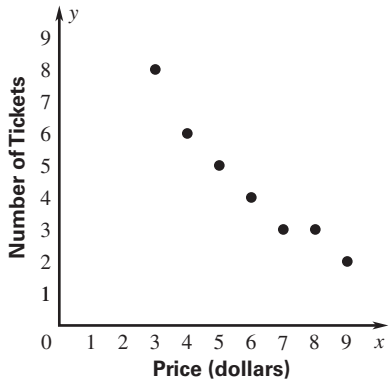
D varied correlation

GO ON

Name _____ Date _____

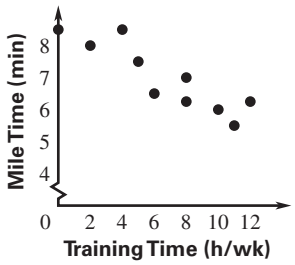
SPI 3102.5.3 (continued)

4 Which statement best describes the correlation between the number of tickets purchased and the price of a ticket?



A negative correlation
B positive correlation
C no correlation
D steady correlation

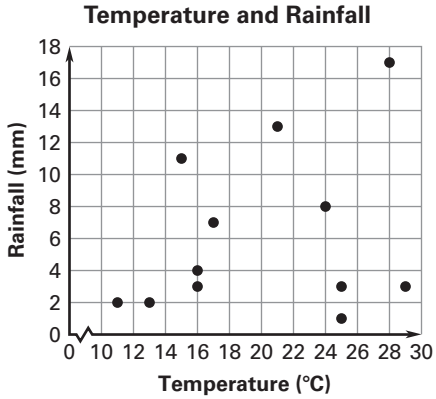
5 The scatter plot below shows the time it took 10 people to run a mile and the number of hours they spent training each week.



Which statement is best supported by the scatter plot?

F There is no relationship between the mile time and the training time.
G The mile time decreases as the training time increases.
H The mile time increases as the training time increases.
J The mile time remains constant as the training time increases.

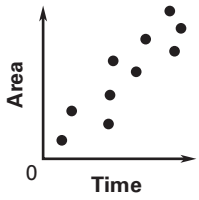
6 Brenda's scatter plot compares temperature when it starts to rain with total rainfall. Which statement best describes the correlation between temperature and rainfall?



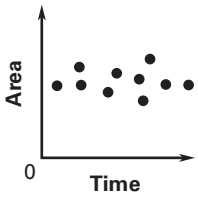
A positive correlation
B negative correlation
C no correlation
D weak positive correlation

7 Which scatter plot most likely represents the area of the circle formed by an oil spill and time after the oil was spilled?

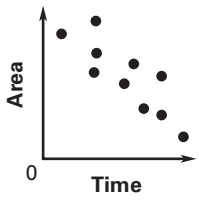
F



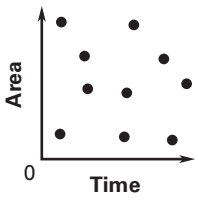
H



G



J



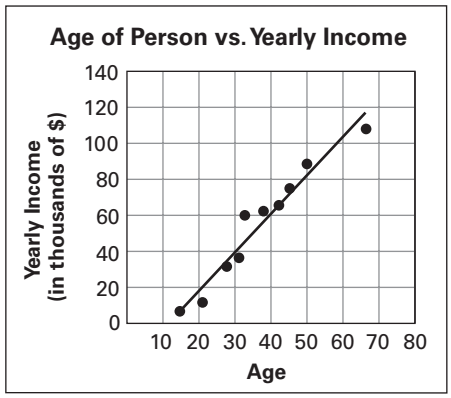
GO ON

Name _____ Date _____

SPI 3102.5.4

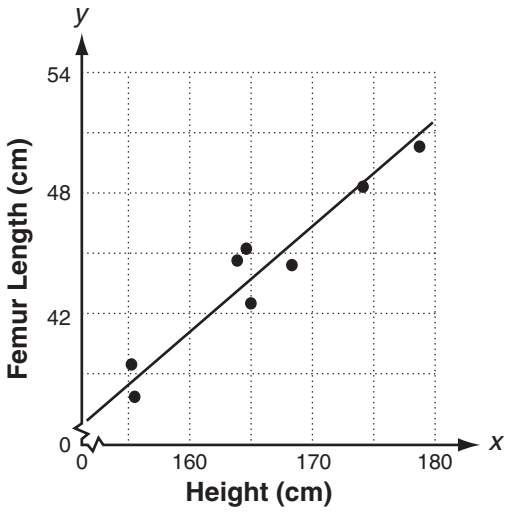
Generate the equation of a line that fits linear data and use it to make a prediction.

1 Which equation best describes the line of best fit shown on the scatter plot?



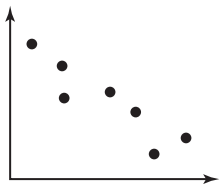
A $y = 0.4x - 35$
B $y = 0.4x - 70$
C $y = 2.5x - 35$
D $y = 2.5x - 70$

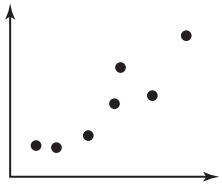
2 Use the line of best fit to predict the femur length of a person who is 190 centimeters tall.

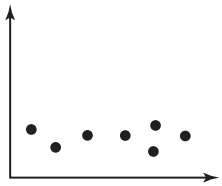


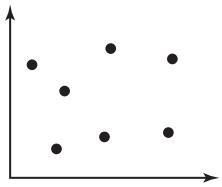
F about 51 cm
G about 56 cm
H about 66 cm
J about 72 cm

3 Which graph shows a negative correlation?

A


B


C


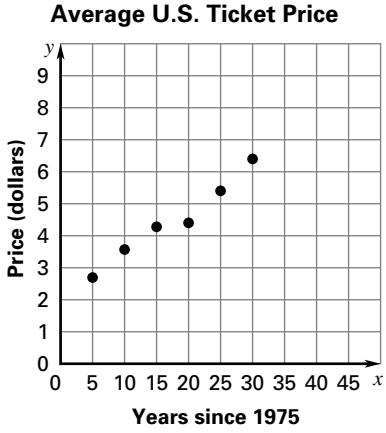
D


GO ON

Name _____ Date _____

SPI 3102.5.4 (continued)

4 The scatter plot shows the average cost of a movie ticket in the United States, where x is the number of years since 1975.



Which type of relationship appears to be the least likely to exist among the data?

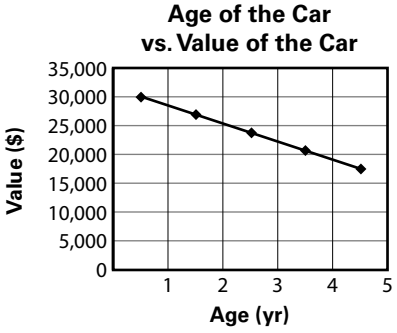
A linear

B exponential

C quadratic

D logarithmic

5 Use the graph below to predict the value of the car when it was new.



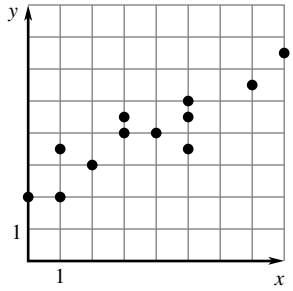
A $28,000

B $30,000

C $32,000

D $35,000

6 Which equation represents the most reasonable line of fit for this scatter plot?



F $y = \frac{1}{2}x$

G $y = -\frac{1}{2}x + 2$

H $y = 2x + 2$

J $y = \frac{1}{2}x + 2$

GO ON

Name _____ Date _____

SPI 3102.5.5

Determine theoretical and/or experimental probability of an event and/or its complement including using relative frequency.

1 You take the bus to school. You keep track for 15 days to see if the bus is on time, late, or early. The bus is never early. It is late 5 times and on time the other 10 days. To the nearest tenth, what is the experimental probability that the bus will be late?

A 0.8

B 0.3

C 0.5

D 1.0

2 Before a city election, 128 voters were asked if they would support candidate A. Seventy-two voters replied that they will support candidate A. What is the experimental probability that a city voter will support candidate A?

F $\frac{9}{16}$

G $\frac{1}{4}$

H $\frac{15}{16}$

J $\frac{1}{19}$

3 Sally has a penny. She flips the penny 55 times. It lands on heads 30 times and it lands on tails 25 times. What is the experimental probability that she will get heads on any given flip?

A 30%

B 25%

C 100%

D 55%

GO ON

Name _____ Date _____

SPI 3102.5.5 (continued)

4 Manny attempts 16 free throws in a basketball game. His results are shown below:

Attempt 1: miss	Attempt 9: miss
Attempt 2: miss	Attempt 10: make
Attempt 3: make	Attempt 11: miss
Attempt 4: make	Attempt 12: make
Attempt 5: make	Attempt 13: make
Attempt 6: miss	Attempt 14: miss
Attempt 7: make	Attempt 15: miss
Attempt 8: miss	Attempt 16: make

Suppose in the next game he attempts 12 free throws. Which is the best prediction for the number that he will make?

F 12

G 6

H 8

J 4

5 Brooke scored the following points during a bowling competition.

124, 138, 110, 94, 120, 112, 100, 115

What is the experimental probability that Brooke scores 120 or greater?

A 25%

B 37.5%

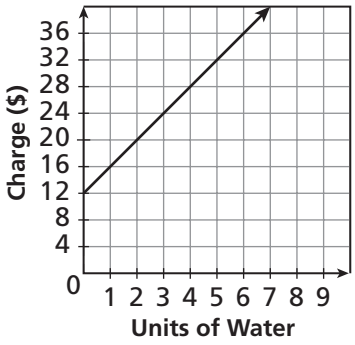
C 50%

D 62.5%

Name _____ Date _____

Post Test

1 A power company charges a monthly water-service fee plus a charge for each unit of water a customer uses.



What is the charge for a unit of water?

A $2

B $4

C $6

D $12

2 What is $\frac{(x-1)^2(1-x)^5}{(1-x)^3(x-1)^4}$ in simplest form?

F $\frac{(1-x)^7}{(x-1)^7}$

G -1

H 1

J $\frac{(1-x)^2}{(x-1)^2}$

3 $\frac{2x^3y^3}{8xy^2} = ?$

A $\frac{x^3y}{4}$

B $\frac{x^2y}{4}$

C $\frac{x^2y}{6}$

D $\frac{x^4y^5}{6}$

4 Solve for y.

$$|2 - 3y| + 4 = 7$$

F $y = \frac{1}{3}$ or $y = \frac{5}{3}$

G $y = -\frac{1}{3}$ or $y = \frac{5}{3}$

H $y = -\frac{1}{3}$ or $y = \frac{1}{3}$

J $y = \frac{1}{3}$ or $y = -\frac{5}{3}$

GO ON

Name _____ Date _____

Post Test (continued)

5 What are the solutions of the quadratic equation $-3y + 28 = y^2$?

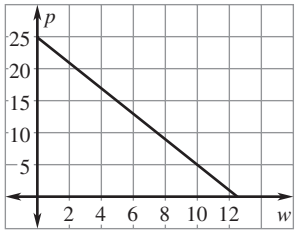
A $-7, -4$

B $-4, 7$

C $-7, 4$

D $4, 7$

6 Heidi buys some pencils, then uses up the same number each week. The graph below shows how many pencils p Heidi has left after w weeks. Which equation describes the relationship between w and p in the graph?



F $p = 25 + w$

G $p = 25 - 2w$

H $p = 25 + 2w$

J $p = 25 - w$

7 Oscar wants to fill a pond that irrigates his crops. One water source fills the pond 1.5 times faster than a second source. When both sources are used together, the pond is filled in 6 hours. Which equation describes how fast both sources can fill the pond together?

A $\frac{1}{r} + \frac{2}{3r} = \frac{1}{6}$

B $\frac{1}{r} - \frac{3}{2r} = \frac{1}{6}$

C $6 = 1.5r + r$

D $6 = r + \frac{1}{2}r$

8 Which of the following quadratic equations has the solutions $x = 2 \pm 6$?

F $x^2 - 4x = 16$

G $x^2 - 4x - 32 = 0$

H $x^2 - 4x = -32$

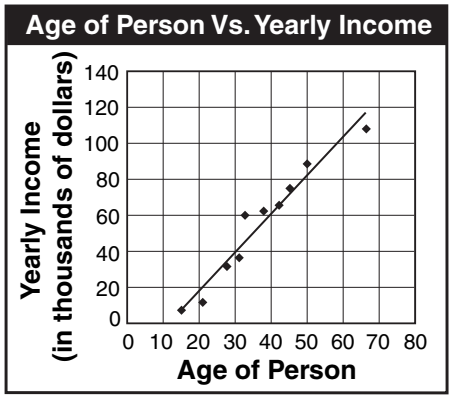
J $x^2 - 4x + 16 = 0$

GO ON

Name _____ Date _____

Post Test (continued)

9 The scatter plot compares yearly income and age. Use the scatter plot to answer Questions 9 and 10.



Using the line of best fit, what is the age of a person who earns $102,000?

A 58 years old

B 60 years old

C 66 years old

D 70 years old

10 Which equation best describes the line of best fit?

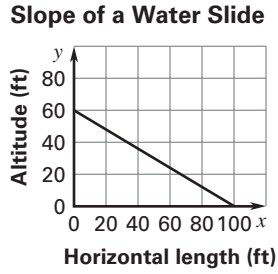
F $y = -2x + 20$

G $y = -2x - 20$

H $y = 2x + 20$

J $y = 2x - 20$

11 The graph below compares the decrease in altitude along a water slide to its horizontal length. Which statement best describes the slope of the graph?



A The slide drops 3 feet for every 5 feet of horizontal length.

B The slide drops 1 foot for every 6 feet of horizontal length.

C The slide drops 1 foot for every 1 foot of horizontal length.

D The slide drops 5 feet for every 3 feet of horizontal length.

12 Which is a factor of $-4x^2 + 24x - 36$?

F $4x + 3$

G $4x - 3$

H $x + 3$

J $x - 3$

GO ON

Name _____ Date _____

Post Test (continued)

13 Which equation might represent the relationship between altitude a in miles and elapsed time t in seconds of a space ship taking off from Earth at sea level?

A $a = -3t$

B $a = -5t + 5000$

C $a = 10t$

D $a = 2t - 2000$

14 What is the solution of the system shown below?

$$4x - 5y = 0$$
$$3x - 5y = -5$$

F (5, 3)

G (5, 4)

H (3, 4)

J (5, −4)

15 What happens to the graph of $y = -3x + 2$ when the y-intercept is decreased by 2?

A The new line is half as steep.

B The graph rises left to right.

C The graph is 2 units higher for every value of x.

D The graph passes through the origin.

16 How much 5% maple syrup and water mixture must be added to 100% pure maple syrup to produce 5 quarts of syrup that is 10% maple syrup?

F $3\frac{1}{7}$ quarts

G $4\frac{14}{19}$ quarts

H $4\frac{2}{7}$ quarts

J $5\frac{15}{19}$ quarts

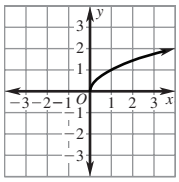
GO ON

Name _____ Date _____

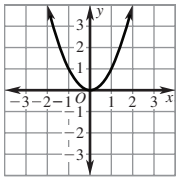
Post Test (continued)

17 Which graph represents $y = |x|$?

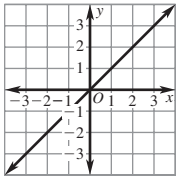
A



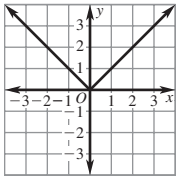
B



C



D



18 Which decimal value comes between $\frac{17}{10}$ and $\frac{43}{18}$?

F 0.42

G 0.60

H 1.91

J 2.50

19 Simplify $2\sqrt{9} - 5\sqrt[3]{8}$.

A 22

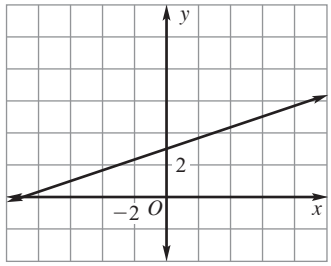
C 16

B -4

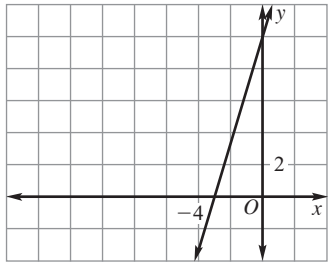
D -10

20 Which of the following is the graph of $y = \frac{1}{3}x + 3$?

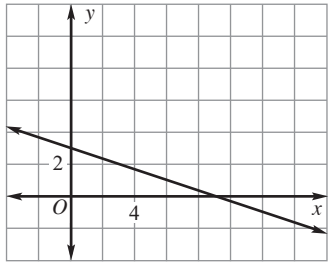
F



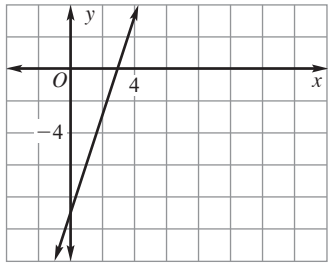
G



H



J



GO ON

Name _____ Date _____

Post Test (continued)

21 A spinner is divided into 4 equal sections of red, gold, blue, and green. The table shows the number of times the spinner lands on each color. Based on the results, which predicts the number of times the spinner will land on gold after 120 spins?

Color	Number of Times
Blue	3
Green	4
Gold	6
Red	3

A 23

B 30

C 45

D 75

22 The diameter of a circle has endpoints (2, 5) and (−6, 5). What are the coordinates of the center of the circle?

F (−2, 5)

G (5, −2)

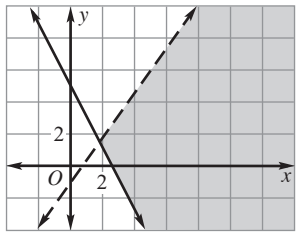
H (−5, 2)

J (6, 2)

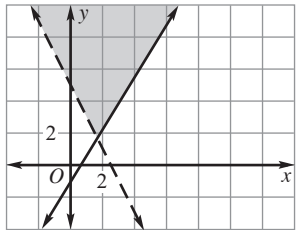
23 Which graph best represents the solution to this system of inequalities?

$$y > \frac{5}{3}x - 1$$
$$y \leq -2x + 5$$

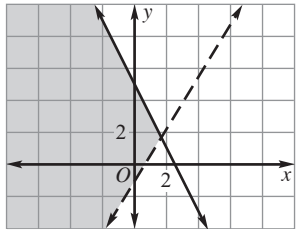
A



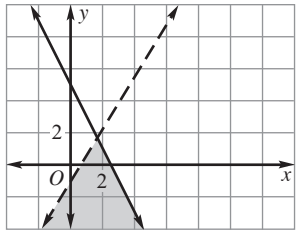
B



C



D



GO ON

Name _____ Date _____

Post Test (continued)

24 Which of the following is the greatest common factor of the terms of $2x^6 + 4x^5 - 3x^4$?

F x^4

G x^5

H $2x^4$

J $2x^5$

25 Seven more than twice a number is equal to eight less than five times the number. Which equation can be used to find the number?

A $7n + 2 = 8n - 5$

B $2n + 7 = 8n - 5$

C $2n + 7 = 5n - 8$

D $7 + 2n = 8 - 5n$

26 What is the range of the function $y = 4x + 2$ if the domain is $\{3, 2, -6, 4\}$?

F $\{10, 6, -26, 14\}$

G $\{3, 2, -6, 4\}$

H $\{-12, -10, 22, 18\}$

J $\{14, 10, -22, 18\}$

27 Which expression is equivalent to $(5y - 3)(5y + 3)$?

A $25y^2 - 9$

B $25y^3 - 9$

C $25y^2 - 15y^2 + 15y - 9$

D $25y^3 + 15y^2 - 15y - 9$

28 What is the solution of this inequality?

$$4 - 3x \geq 2(x - 1)$$

F $\frac{5}{6} \geq x$

G $\frac{6}{5} \geq x$

H $\frac{6}{5} \leq x$

J $\frac{5}{6} \leq x$

GO ON

Name _____ Date _____

Post Test (continued)

29 The formula for converting from Fahrenheit (F) degrees to Celsius (C) degrees is $C = \frac{5}{9}(F - 32)$. Find F if $C = 3$. Round your answer to the nearest degree.

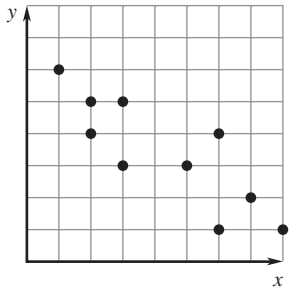
A 17

B 37

C 45

D 62

30 Based on the scatter plot, which statement is true?



F There is a positive correlation between x and y.

G There is a negative correlation between x and y.

H The dependent variable is x.

J There is no correlation between x and y.

31 Simplify the algebraic expression.

$$2(3 - x) + 5(x - 1)$$

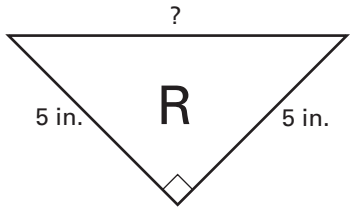
A $3x + 1$

B $3x + 11$

C $7x + 1$

D $7x + 11$

32 Rachel creates a logo in the shape of a right triangle to print on T-shirts for her lawn-mowing business, as shown below.



What is the length of the longest side in the triangle?

F $5\sqrt{2}$ in.

G $5\sqrt{5}$ in.

H $5\sqrt{10}$ in.

J 50 in.

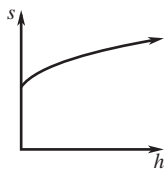
GO ON

Name _____ Date _____

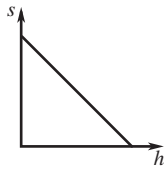
Post Test (continued)

33 Which graph best represents a likely relationship between study time h in hours and a student's score s on a test?

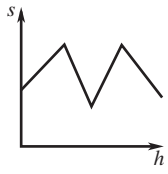
A



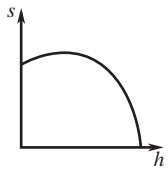
B



C



D



34 Avogadro's number is 6.02×10^{23} and is equal to 1 mole. Which value is equivalent to 1 mole squared?

F 1.204×10^{24}

G 3.624×10^{24}

H 6.02×10^{25}

J 3.624×10^{47}

35 Jim's first three quiz scores are 90, 85, and 88. Which score will Jim have to earn on his next quiz to raise his mean quiz score to 90?

A 90

B 92

C 95

D 97

36 What is the factored form of $4x^3 - 2x^2 + 8x$?

F $x(4x^2 - 2x + 8)$

G $2x(2x^2 - x - 8)$

H $2x(x^2 - 4)(x + 1)$

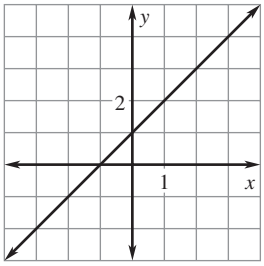
J $2x(2x^2 - x + 4)$

GO ON

Name _____ Date _____

Post Test (continued)

37 The graph of $y = x + 1$ is shown. Which point will lie on the graph if the slope of the line is doubled and the y-intercept stays the same?



A $(-2, -2)$

B $(0, 2)$

C $(1, 2)$

D $(2, 5)$

38 What is the solution of the system shown below?

$$7x + 5y = -3$$
$$y = 9x - 11$$

F $(-2, 3)$

G $(-1, -2)$

H $(1, -2)$

J $(-3, 2)$

39 A rock is dropped from a bridge into a river. If the rock hits the water 5 seconds after it is dropped, what is the height h of the bridge above the water? Use the equation $h = -16t^2$ where t is the time in seconds.

A 80 ft

B 160 ft

C 400 ft

D 800 ft

40 Which of the following is *not* in the range of the set?

$\{(5, -3), (-3, 6), (6, -3), (6, -8)\}$

F -8

G -3

H 5

J 6

GO ON

Name _____ Date _____

Post Test (continued)

41 What is the simplified form of this expression?

$$(-12x - 5y) - (6x + 7y)$$

A $-6x + 2y$

B $-6x - 12y$

C $-18x + 12y$

D $-18x - 12y$

42 Use the formula $C = 2\pi r$ to find the radius, r, when the circumference, C, of a circle is 45 centimeters. Use 3.14 for π.

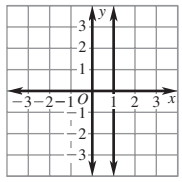
F 7.17 centimeters

G 8.26 centimeters

H 14.33 centimeters

J 22.25 centimeters

43 What is the equation of the graph shown?



A $x = 1$

B $y = x$

C $y = 1$

D $y = |x|$

44 What is the simplified form of this expression?

$$\frac{1}{3x} - \frac{2}{x^2}$$

F $-\frac{1}{3x^2}$

G $\frac{x - 6}{3x^2}$

H $-\frac{6}{3x^2}$

J $\frac{x - 2}{3x^2}$

GO ON

Name _____ Date _____

Post Test (continued)

45 Which phrase or sentence best represents the following?

$$A = \frac{1}{2}(B + b)h$$

A The area is half the sum of the bases and the height.

B The area is half the product of the bases and the height.

C The area is the product of the height and half the sum of the bases.

D The product of the height and half the sum of the bases.

46 Suppose the numbers below are written on separate pieces of paper and placed in a hat.

2, 18, 27, 11, 6, 45, 11, 39

If you are asked to blindly select a piece of paper from the hat, what is the theoretical probability of selecting a piece of paper with 11 on it?

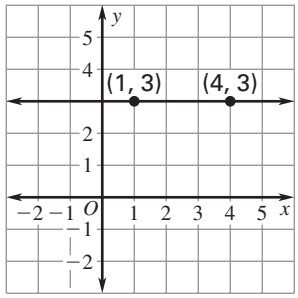
F $\frac{1}{8}$

G $\frac{1}{4}$

H $\frac{1}{2}$

J $\frac{3}{22}$

47 What is the distance between the points shown below?



A 9 units

B 3 units

C $\sqrt{27}$ units

D 5.04 units

48 Which expression is equivalent to $\sqrt[4]{a^2b^7}$ $(a > 0, b > 0)$?

F $b^3 \cdot \sqrt[4]{a^2b^4}$

G $b^7 \cdot \sqrt[4]{a^2b^4}$

H $b \cdot \sqrt[4]{a^2b^3}$

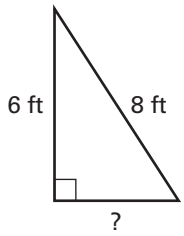
J $b^3 \cdot \sqrt[4]{a^2b^3}$

GO ON

Name _____ Date _____

Post Test (continued)

49 Mr. Fry uses a straight piece of wood that is 8 feet long to prop up an old fence, as shown in the figure.



If the fence is 6 feet tall, how far from the fence is the bottom of the piece of wood?

A 28 ft

B 10 ft

C 7 ft

D $2\sqrt{7}$ ft

50 Which expression will generate the nth term of the sequence 2, 8, 18, 32, 50, . . . ?

F $2n^2$

G $2n$

H $n + 2$

J n^2

51 What is the sum $(7.2 \times 10^5) + (4.6 \times 10^6)$?

A 5.32×10^6

B 1.18×10^6

C 1.18×10^{12}

D 7.66×10^{30}

52 Simplify $(3w^2 - w - 6) - (3w - 10)$.

F $-w + 4$

G $-w - 16$

H $3w^2 - 4w + 4$

J $3w^2 - 4w - 16$

GO ON

Name _____ Date _____

Post Test (continued)

53 For which polynomial is the greatest common factor of the terms $5x$?

A $25x^3 + 5x$

B $5x - 5$

C $15x^2 + 5$

D $30x^2 - 10$

54 The distance a certain mail carrier walks each week varies. The distances she walked the last four weeks are 7 kilometers, 10 kilometers, 9 kilometers, and 12 kilometers. How will adding this week's value of 4 kilometers to this data set affect the mean?

F It will decrease the mean.

G It will increase the mean.

H The mean will equal the median.

J It will not change the mean.

GO ON

Name _____ Date _____

Post Test (continued)

55 The function $f(x) = x^2 - 1$ is obtained by translating $g(x)$ one unit up. Which equation describes $g(x)$?

A $y = x^2 - 2$

B $y = x^2$

C $y = x^2 + 1$

D $y = 1 - x^2$

56 What is the value of $|4x + 2|$ for $x = -1$?

F -6

G -2

H 2

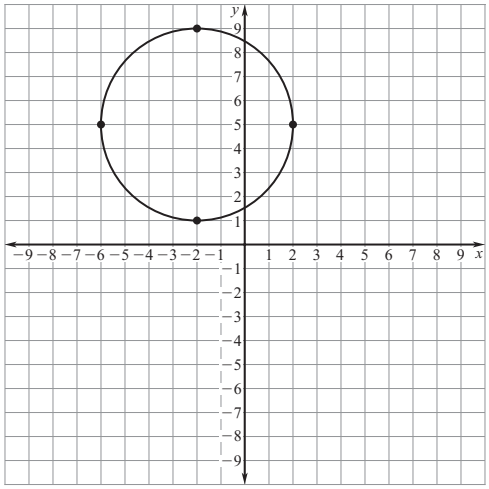
J 6

GO ON

Name _____ Date _____

Post Test (continued)

57 What is the area of the circle shown below to the nearest hundredth? Use 3.14 for π.



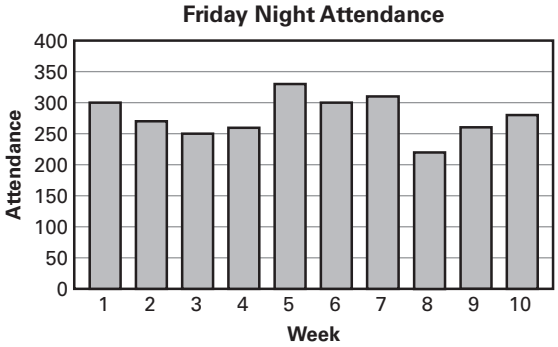
A 201.06 units^2

B 25.13 units^2

C 50.27 units^2

D 12.57 units^2

58 Which claim is supported by the data?



F The movie shown on Friday night during week 5 received the best reviews.

G Attendance for the movie shown on Friday night during week 8 was low because of a snowstorm.

H The movie shown on Friday night during week 5 had the highest attendance.

J The Friday night attendance during weeks 3 and 4 are similar because the movies shown those weeks attracted a younger audience.

GO ON

Name _____ Date _____

Post Test (continued)

59 Which is an equation of the line through $(3, -1)$ with slope $-\frac{2}{3}$?

A $2x + 3y = 3$

B $3x + 2y = 7$

C $3x - y = 10$

D $x - 3y = 67$

60 Which is the 12th term in the sequence $40, 29, 18, 7, -4, \ldots$?

F -59

G -70

H -81

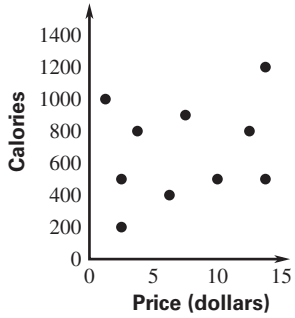
J -92

GO ON

Name _____ Date _____

Post Test (continued)

61 The scatter plot shows the relationship between the number of calories in a sandwich and the price of the sandwich.



Which statement is best supported by the scatter plot?

A There is little relationship between the number of calories and the price of a sandwich.

B The more calories in a sandwich, the greater the price.

C The more calories in a sandwich, the lower the price.

D The price of a sandwich remains constant.

62 Evaluate $9 - 8n$ for $n = 5$.

F -49

G -31

H 31

J 49

GO ON

Name _____ Date _____

Post Test (continued)

63 The distances a bee flew to get nectar are 3 meters, 8 meters, 6 meters, and 7 meters. How will adding 4 meters to this data set affect the mean?

A It will increase the mean.

B It will decrease the mean.

C It will not change the mean.

D The mean will equal the median.

64 Which of the following has the least value?

F $\frac{1}{3}$

G $\frac{5}{21}$

H 0.28

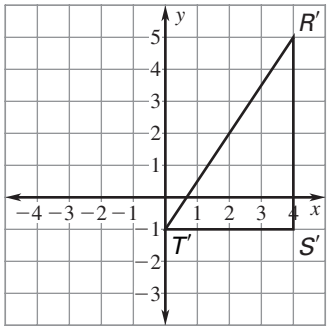
J 0.42

GO ON

Name _____ Date _____

Post Test (continued)

65 What is the area of the triangle shown below?



A 24 units^2

B 12 units^2

C 10 units^2

D 20 units^2

Name _____ Date _____

Pre Test

Fill in the correct answer

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Name _____ Date _____

Post Test

Fill in the correct answer

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