Part 2: Multiple Choice and Entry Box

Choose all correct answers.

1. If $\sqrt{x-a} = \sqrt{x+b}$, which of the following may be true?

A. a = 0

B. b = 0

C. a + b = 0; where a and b ≠ 0

D. a - b = 0; where a and b ≠ 0

E. $a^2 + b^2 = 0$, where a and b ≠ 0

2. If the graph of the function *f* is a line with slope 2, which of the following could be the equation of *f*?

A. f(x) = 4x - 2

B. f(x) = 2x + 4

C. f(x) = -2x - 2

D. $f(x) = \frac{1}{2}x + 2$

E. $f(x) = 2x + \frac{1}{2}$

Enter answer in box.

3. Machine 1, working at a constant rate, can produce x bolts per hour. Machine 2, working at a constant rate, can produce x + 6 bolts per hour. In terms of x, how many bolts can both machines working together at their respective rates produce in 4 hours?

Answer:

Choose the correct answer.

4. If $\sqrt{x} = 16$, what is the value of $\sqrt{4x}$?

A. 16

B. 32

C. 64

D. 128

E. 256

5. $\frac{1}{2} * \frac{2}{3} * \frac{3}{4} * \frac{4}{5} * \frac{5}{6} * \frac{6}{7} =$

A. $\frac{1}{7}$

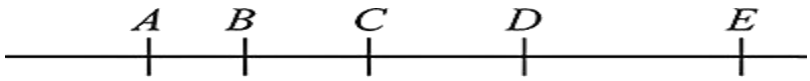
B. $\frac{3}{5}$

C. $\frac{21}{27}$

D. $\frac{6}{7}$

E. $\frac{7}{8}$

6.



On the line above, if AB < BC < CD < DE, which of the following must be true?

A. AC < CD

B. AC < CE

C. AD < CE

D. AD < DE

E. BD < DE

Enter answer in box.

7. If x + y = 3 and x – y = 5, then x^2 - y^2 =

Answer:

8. If $\frac{x}{y}$ = 3, and x = 12, then x – y =

Answer:

Choose correct answer.

9. A manager estimates that if the company charges p dollars for their new product, $0 \leq p \leq 200$, where then the revenue from the product will be r(p) = 2000p - 10p^2 dollars each week. According to this model, for which of the following values of p would the company's weekly revenue for the product be the greatest?

A. 10
B. 20
C. 50
D. 100
E. 200

10. If x + 2x is 5 more than y + 2y, then x – y =?

A. -5

B. $-\frac{5}{3}$

C. $\frac{3}{5}$

D. $\frac{5}{3}$

E. 5

11. If y = $\frac{(x+1)(x-2)}{(x+3)(x-4)}$, for which of the following values of x is y not defined?

A. -4

B. -3

C. -1

D. 2

E. 3

FAVORITE MOVIE GENRE

12. In a survey, a group of students were asked about their favorite movie genre. Each student in the group selected exactly one movie genre, and the data collected is summarized in the circle graph above. If 40 more students chose 'Action' than 'Fiction', how many students were surveyed?

A. 100
B. 150
C. 200
D. 250
E. 300

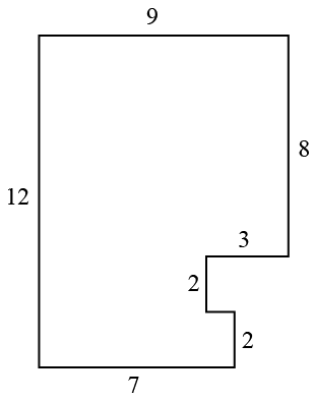
13. If the graph of the function f in the xy-plane contains the points (0,-9), (1,-4), and (3,0), which of the following cannot be true?

A. The graph of f has a maximum value.
B. $y \leq 0$ for all points (x,y) on the graph of f.
C. The graph of f is symmetric with respect to a line.
D. The graph of f is a line.
E. The graph of f is a parabola.

14. In a class of 80 seniors, there are 3 boys for every 5 girls. In the junior class, there are 3 boys for every 2 girls. If the two classes combined have an equal number of boys and girls, how many students are in the junior class?

A. 72
B. 80
C. 84
D. 100
E. 120

15.



In the figure above, all intersecting sides of the polygon meet at right angles. What is the area of the polygon?

A. 108
B. 104
C. 102
D. 98
E. 96

16. In a certain lawn-mower factory, 0.06 percent of all mowers produced are defective. On the average, there will be 3 defective mowers out of how many produced?

A. 500
B. 1800
C. 5000
D. 18,000
E. 50,000

17. How many integers satisfy the inequality?

$$|x - 5| \leq 2$$

A. None
B. One
C. Two
D. Three
E. Five

18. A mechanic can install carburetors in 3 cars every 4 hours. At that rate, how long will it take the mechanic to install carburetors in 5 cars?

A. 6 hr 20 min
B. 6 hr 40 min
C. 7 hr 15 min
D. 7 hr 30 min
E. 7 hr 45 min

19. What is the volume of a cube with surface area $54x^2$?

A. $9x^2$
B. $27x^3$
C. $81x^2$
D. $81x^3$
E. $729x^3$

20. All numbers divisible by both 4 and 15 are also divisible by which of the following?

A. 6
B. 8
C. 18
D. 24
E. 45

Match equation with proper form.

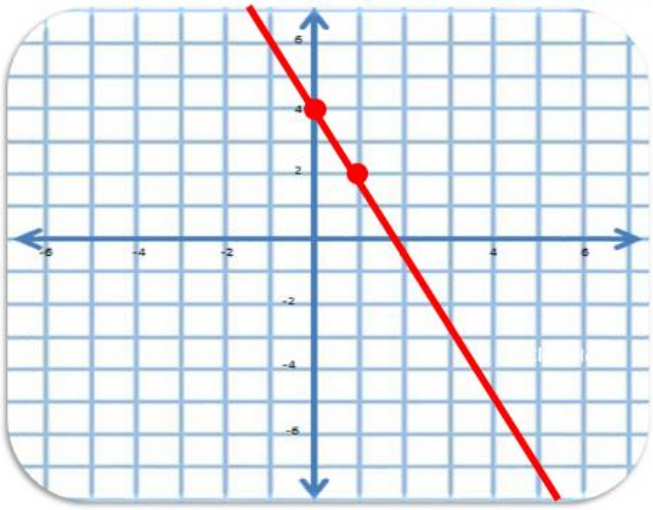
21.

Equations	3 Forms of Linear Equations
$y = mx + b$	**Standard Form**
$y - y_1 = m(x - x_1)$	**Slope-Intercept Form**
$Ax + By = C$	**Point-Slope Form**

22.

$y = -2x + 4$

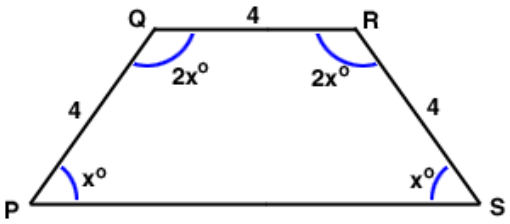
Is this correct graph of equation?



A. Yes

B. No

Choose correct answer.



23.

What is the length of the line PS?

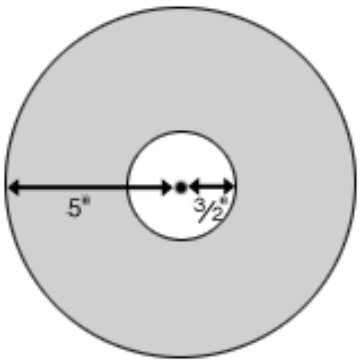
A. 6

B. 8

C. 9

D. 10

E. 12



24.

An employee at Topp's Bakery is making a wedding cake. The shaded surface pictured above is the top of the cake. In terms of square inches, what is the area that must be covered with icing, assuming that only the surface is covered?

A. $\frac{9}{4}\pi$

B. $\frac{7}{2}\pi$

C. 2π

D. 25π

E. $\frac{91}{4}\pi$

25. Driving at a constant pace, it takes Lynne one hour to drive 40 miles to work. Today she has driven at half her usual average speed for the first 30 minutes of her trip. What speed must she average for the rest of her trip in order for the total trip to take her one hour?

A. 20 miles per hour

B. 30 miles per hour

C. 40 miles per hour

D. 60 miles per hour

E. She cannot make it in one hour

ANSWER SHEET (Part 2)

1. If $\sqrt{x-a} = \sqrt{x+b}$, which of the following may be true?

All highlighted in red may be true. Choice E can never be true because squaring a negative (non-zero) number makes it positive.

A. a = 0
B. b = 0
C. a + b = 0; where a and b ≠ 0
D. a - b = 0; where a and b ≠ 0
E. $a^2 + b^2 = 0$, where a and b ≠ 0

2. If the graph of the function *f* is a line with slope 2, which of the following could be the equation of *f*?

All highlighted in red may be true. Slope is found as the coefficient of the x-varaible.

A. f(x) = 4x - 2
B. f(x) = 2x + 4
C. f(x) = -2x - 2
D. $f(x) = \frac{1}{2}x + 2$
E. $f(x) = 2x + \frac{1}{2}$

3. Machine 1, working at a constant rate, can produce x bolts per hour. Machine 2, working at a constant rate, can produce x + 6 bolts per hour. How many bolts can both machines working together at their respective rates produce in 4 hours?

Answer: (Machine 1): 4x; (Machine 2): 4x + 24; Both together: 8x + 24

4. B

If $\sqrt{x}$ = 16, then x = 16^2 or 256

The value of $\sqrt{4x}$ is $\sqrt{4(256)}$ = $\sqrt{1024}$ = 32

5. A

$\frac{1}{2} * \frac{2}{3} * \frac{3}{4} * \frac{4}{5} * \frac{5}{6} * \frac{6}{7}$ can be simplified by canceling 2, 3, 4, 5, and 6, leaving the answer to be $\frac{1}{7}$

6. B

If AB < BC < CD < DE, then A times C must be less than C times E. The answer is AC < CE

7. If x + y = 3 and x – y = 5, then x^2 - y^2 =

A system of equations using elimination by adding yields:

x + y = 3
x – y = 5
2x = 8
x = 4

Substituting the x = 4 into either equation yields y = -1

Therefore, 4^2 - -1^2 = 15

8. If $\frac{x}{y}$ = 3, and x = 12, then x – y =

$\frac{12}{y}$ = 3; y = 4

Therefore, 12 – 4 = 8

9. D

A manager estimates that if the company charges p dollars for their new product, $0 \leq p \leq 200$, where then the revenue from the product will be r(p) = 2000p - $10p^2$ dollars each week. According to this model, for which of the following values of p would the company's weekly revenue for the product be the greatest?

This question is asking you to find the maximum value for r(p).

r(p) = 2000(100) – 10(100^2)

r(p) is greatest when p =100

10. E

If x + 2x is 5 more than y + 2y, then x – y =?

When x + 2x = y + 2y + 5, then we know x = y + 5 have the same value. Therefore, x – y = 5

11. B

If y = $\frac{(x+1)(x-2)}{(x+3)(x-4)}$, for which of the following values of x is y not defined?

Of the given values, only -3 would be undefined.

$\frac{(-3+1)(-3-2)}{(-3+3)(-3-4)} = \frac{(-2)(-5)}{(0)(-7)} = \frac{10}{0}$ = undefined

12. D

In a survey, a group of students were asked about their favorite movie genre. Each student in the group selected exactly one movie genre, and the data collected is summarized in the circle graph above. If 40 more students chose 'Action' than 'Fiction', how many students were surveyed?

.3x = .14x + 40
.16x = 40
x = 250

13. D

If the graph of the function f in the xy-plane contains the points (0,-9), (1,-4), and (3,0), which of the following cannot be true?

The points do not form a linear equation. In order for a straight line to be formed, the slope must be consistent. $\frac{change\ in\ y-coordinates}{change\ in\ x-coordinates}$. One set of ordered pairs yields a slope of 2, one yields a slope of 5, and in the other set of ordered pairs, the slope is 3. Therefore, the graph of f cannot be a line.

14. D

In a class of 80 seniors, there are 3 boys for every 5 girls. In the junior class, there are 3 boys for every 2 girls. If the two classes combined have an equal number of boys and girls, how many students are in the junior class?

$\frac{3}{8}x = 80$ and $\frac{5}{8}x = 80$, therefore there are 30 boys and 50 girls in the senior class.

Junior class has $\frac{3\ boys}{2\ girls}$

$30 + \frac{3}{5}x = 50 + \frac{2}{5}x$

$\frac{1}{5}x = 20$

$x = 100$

17. E

How many integers satisfy the inequality?

$$|x - 5| \leq 2$$

$x - 5 \leq 2$ and $x - 5 \geq -2$

$x \leq 7$ and $x \geq 3$

$3 \leq x \leq 7$

5 integers satisfy this absolute value inequality.

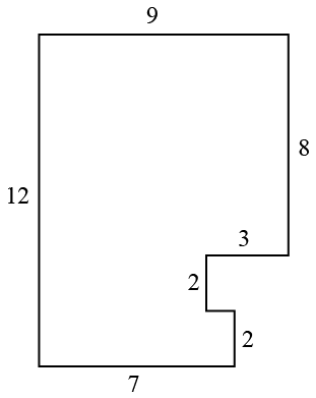
18. B

A mechanic can install carburetors in 3 cars every 4 hours. At that rate, how long will it take the mechanic to install carburetors in 5 cars?

$\frac{3\ cars}{4\ hours} = \frac{5\ cars}{x\ hours}$, cross multiplying yields $3x = 20$; $x = 6\frac{2}{3}$ hours or 6 hours and 40 minutes.

15. E

If all intersecting sides of the polygon meet at right angles. What is the area of the polygon?



Area = (9)(12) – (3)(2)- (2)(2)

= 108 – 6 – 6

=96

16. C

In a certain lawn-mower factory, 0.06 percent of all mowers produced are defective. On the average, there will be 3 defective mowers out of how many produced?

.0006x = 3

x = 5000

19. B

What is the volume of a cube with surface area $54cm^2$?

Surface area of cube is SA = $6s^2$, therefore solving we get $6s^2$= 54; s = 3

Volume of a cube is V = s^3, therefore V = 3^3 = 27 cm^3

20. A

All numbers divisible by both 4 and 15 are also divisible by which of the following?

(4)(15) = 60, and of the choices given, only 6 is correct.

21.

Standard Form $Ax + By = C$
Slope-Intercept Form $y = mx + b$
Point-Slope Form $y - y_1 = m(x - x_1)$

22.

The graph of $y = -2x + 4$ is correct. Slope is -2 and y-intercept is (0, 4)

23. B

The figure is formed from three equilateral (equal-sided) triangles. Since all the sides are equal, the line PS has length 4 + 4 = 8.

24. E

inner circle = $(3/2)^2\pi = 9/4\pi$

outer circle = $5^2\pi = 25\pi$

Subtract to get the area: $100/4\pi - 9/4\pi = 91/4\pi$

25. D

Lynne travelled at 20 miles per hour (half of 40 miles per hour) for 30 minutes. Therefore, she travelled 10 miles, leaving her 30 miles to go to get to work. If the whole trip is to take one hour, then she has go 30 miles in 30 minutes. This means she has to drive 60 miles per hour.