



16

Which expression is equivalent to $5xy + 15x^2y + 20xy^2$?

- A) $5xy(3x + 4y)$
- B) $5xy(15x + 20y)$
- C) $5xy(1 + 3x + 4y)$
- D) $5xy(1 + 15x + 20y)$

17

The line with equation $x = 0$ intersects the circle with equation $x^2 + y^2 = 16$ at two points in the xy -plane. What is one of the points of intersection?

- A) $(-4, 0)$
- B) $(0, -4)$
- C) $(0, 0)$
- D) $(4, 0)$

18

Terrell made 48 cups of strawberry jam. He then filled x small jars and y large jars with all the jam he made. The equation $x + 2y = 48$ represents this situation. Which is the best interpretation of $2y$ in this context?

- A) The number of small jars Terrell filled
- B) The number of large jars Terrell filled
- C) The total number of cups of jam in the small jars
- D) The total number of cups of jam in the large jars



19

The table gives the distribution of ice cream flavor and topping option for customer orders at an ice cream shop.

Flavor	Topping option	
	<i>Sprinkles</i>	<i>No sprinkles</i>
Chocolate	60	20
Vanilla	30	10
Twist	90	10

If a customer order is selected at random, what is the probability of selecting an order with sprinkles, given the flavor is vanilla?

- A) 0.17
- B) 0.33
- C) 0.75
- D) 0.82

20

What is the y -intercept of the graph of

$$y = 6\left(\frac{1}{2}\right)^x - 3 \text{ in the } xy\text{-plane?}$$

- A) (0, -3)
- B) (0, -1)
- C) (0, 1)
- D) (0, 3)

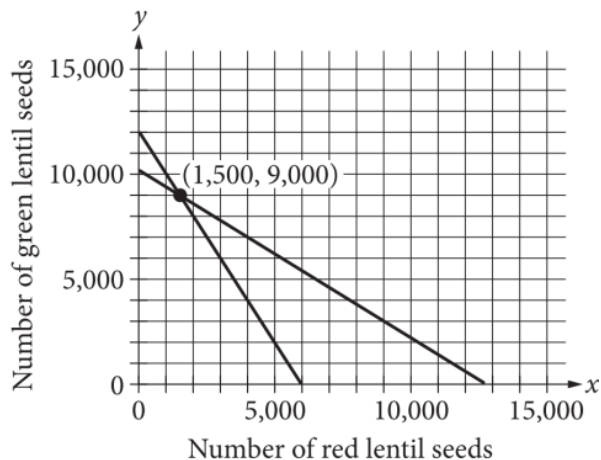
21

The ratio of a rectangle's width to its length is 4 to 9. If the width of the rectangle is w , which expression represents the length of the rectangle?

- A) $\frac{4}{9}w$
- B) $\frac{9}{4}w$
- C) $11w$
- D) $36w$



22



A system of equations is represented in the graph. One part of the system represents the number of red lentil seeds and green lentil seeds William can plot in 100 square meters if he plants a fixed number of each type of seed in each square meter. The other part of the system represents the number of each type of seed he can purchase with \$510. Which of the following systems represents this system?

- A) $\frac{x}{60} + \frac{y}{120} = 100$
 $0.04x + 0.05y = 510$
- B) $\frac{x}{60} + \frac{y}{120} = 510$
 $0.04x + 0.05y = 100$
- C) $60x + 120y = 100$
 $\frac{x}{0.04} + \frac{y}{0.05} = 510$
- D) $60x + 120y = 510$
 $\frac{x}{0.04} + \frac{y}{0.05} = 100$

23

Cone T is a right circular cone with a radius of r and height of h , as shown. The volume of cone W (not shown) is $\frac{1}{27}$ times the volume of cone T.

Which of the following could be the dimensions of cone W?

- A) height = $\frac{1}{27}h$
- B) height = $\frac{1}{9}h$
- C) radius = $\frac{1}{3}r$
- D) radius = $3r$

24

If $x > 0$ and x is 160% of y , which expression represents y in terms of x ?

- A) $0.160x$
- B) $0.625x$
- C) $1.600x$
- D) $6.250x$



25

$$|x + 11| = 24$$

What is the sum of the solutions to the given equation?

- A) -22
- B) 0
- C) 13
- D) 48

26

$$2x - 12y = 8$$

One of the two linear equations in a system is given. The system has no solution. Which equation could be the second equation in this system?

- A) $x - 6y = 4$
- B) $x - 4y = 0$
- C) $\frac{1}{2}x - 3y = 2$
- D) $\frac{1}{2}x - 3y = 0$

27

The value of a house increased by 8% from January 1, 2016, to January 1, 2017. Then, the value of the house decreased by 3% from January 1, 2017, to January 1, 2018. What was the net percentage increase in the value of the house from January 1, 2016, to January 1, 2018?

- A) 4.76%
- B) 4.85%
- C) 5.00%
- D) 5.24%

**DIRECTIONS**

For questions 28 - 31, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

- Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
- Mark no more than one circle in any column.
- No question has a negative answer.
- Some problems may have more than one correct answer. In such cases, grid only one answer.
- Mixed numbers** such as $3\frac{1}{2}$ must be gridded as 3.5 or $7/2$. (If $\begin{array}{|c|c|c|c|} \hline 3 & 1 & / & 2 \\ \hline \bullet & \bullet & \bullet & \bullet \\ \hline \end{array}$ is entered into the grid, it will be interpreted as $\frac{31}{2}$, not $3\frac{1}{2}$.)
- Decimal answers:** If you obtain a decimal answer with more digits than the grid can accommodate, it may be either rounded or truncated, but it must fill the entire grid.

Write answer in boxes. →

Grid in result. ←

Answer: $\frac{7}{12}$

	7	/	1	2
•	•	•	•	•
	0	0	0	0
①	①	•	①	
②	②	②	•	
③	③	③	③	
④	④	④	④	
⑤	⑤	⑤	⑤	
⑥	⑥	⑥	⑥	
•	⑦	⑦	⑦	
⑧	⑧	⑧	⑧	
⑨	⑨	⑨	⑨	

← Fraction line

Answer: 2.5

	2	.	5
•	•	•	•
	0	0	0
①	①	①	①
②	•	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	•
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

← Decimal point

Acceptable ways to grid $\frac{2}{3}$ are:

	2	/	3
•	•	•	•
	0	0	0
①	①	①	①
②	•	②	②
③	③	③	•
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

.	6	6	6
•	•	•	•
	0	0	0
①	①	①	①
②	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	•	•	•
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

.	6	6	7
•	•	•	•
	0	0	0
①	①	①	①
②	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	•	•	⑥
⑦	⑦	⑦	•
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

Answer: 201 – either position is correct

	2	0	1
•	•	•	•
	0	•	0
①	①	①	•
②	•	②	②
③	③	③	③

2	0	1	
•	•	•	•
	•	0	0
①	①	•	①
•	②	②	②
③	③	③	③

NOTE: You may start your answers in any column, space permitting. Columns you don't need to use should be left blank.



28

If $\frac{2x+3}{5} + 1 = \frac{4}{5} + 1$, what is the value of $2x + 3$?

29

A quadratic function can be used to model the height, in feet, of an object above the ground in terms of the time, in seconds, after the object was launched. According to the model, an object was launched into the air from a height of 0 feet and reached its maximum height of 3136 feet 14 seconds after it was launched. Based on the model, what was the height, in feet, of the object 1 second after it was launched?



Questions 30 and 31 refer to the following information.

$$\frac{3550}{3550 + 2500 + c}$$

Students and Lecturers at Medical Schools in 2006		
Country	Students	Lecturers
Germany	79,866	3550
Spain	36,049	2500
Turkey	32,985	9020

The table shows the number of students and the number of lecturers at medical schools for three countries. No student can be a lecturer.

30

A person who in 2006 was a lecturer at a medical school in Germany, Spain, or Turkey will be selected at random. The expression shown, where c is a constant, represents the probability that the person selected will be a lecturer at a medical school in Germany. What is the value of c ?

31

At medical schools in Spain in 2006, the ratio of the number of students to the number of lecturers was $k:1$. What is the value of k , rounded to the nearest tenth?

STOP

**If you finish before time is called, you may check your work on this section only.
Do not turn to any other section.**