

NO Calculator

8 SYSTEM OF EQUATIONS

Multiple Choice

1 8

$$3x + x + x + x - 3 - 2 = 7 + x + x$$

In the equation above, what is the value of x ?

- A) $-\frac{5}{7}$
- B) 1
- C) $\frac{12}{7}$
- D) 3

1 2

If $5x + 6 = 10$, what is the value of $10x + 3$?

- A) 4
- B) 9
- C) 11
- D) 20

1 1

If $\frac{x-1}{3} = k$ and $k = 3$, what is the value of x ?

- A) 2
- B) 4
- C) 9
- D) 10

2 2

$$\begin{aligned} x + y &= 0 \\ 3x - 2y &= 10 \end{aligned}$$

Which of the following ordered pairs (x, y) satisfies the system of equations above?

- A) $(3, -2)$
- B) $(2, -2)$
- C) $(-2, 2)$
- D) $(-2, -2)$

3 7

$$\begin{aligned} x &= y - 3 \\ \frac{x}{2} + 2y &= 6 \end{aligned}$$

Which ordered pair (x, y) satisfies the system of equations shown above?

- A) $(-3, 0)$
- B) $(0, 3)$
- C) $(6, -3)$
- D) $(36, -6)$

5 8

The width of a rectangular dance floor is w feet. The length of the floor is 6 feet longer than its width. Which of the following expresses the perimeter, in feet, of the dance floor in terms of w ?

- A) $2w + 6$
- B) $4w + 12$
- C) $w^2 + 6$
- D) $w^2 + 6w$

6 8

$$\begin{aligned} y &> 2x - 1 \\ 2x &> 5 \end{aligned}$$

Which of the following consists of the y -coordinates of all the points that satisfy the system of inequalities above?

- A) $y > 6$
- B) $y > 4$
- C) $y > \frac{5}{2}$
- D) $y > \frac{3}{2}$

9 1

$$\begin{aligned} 3x + 4y &= -23 \\ 2y - x &= -19 \end{aligned}$$

What is the solution (x, y) to the system of equations above?

- A) $(-5, -2)$
- B) $(3, -8)$
- C) $(4, -6)$
- D) $(9, -6)$

6 6

If $x = \frac{2}{3}y$ and $y = 18$, what is the value of $2x - 3$?

- A) 21
- B) 15
- C) 12
- D) 10

NO Calculator
SYSTEM OF EQUATIONS

Student Response

16 _____ **7**

If $2x + 8 = 16$, what is the value of $x + 4$?

18 _____ **5**

$$\begin{aligned}\frac{1}{2}(2x + y) &= \frac{21}{2} \\ y &= 2x\end{aligned}$$

The system of equations above has solution (x, y) .
What is the value of x ?

17 _____ **5**

$$2(p + 1) + 8(p - 1) = 5p$$

What value of p is the solution of the equation above?

18 _____ **1**

$$\begin{aligned}x + y &= -9 \\ x + 2y &= -25\end{aligned}$$

According to the system of equations above, what is the value of x ?

17 _____ **6**

$$\frac{2}{3}t = \frac{5}{2}$$

What value of t is the solution of the equation above?

18 _____ **8**

$$\begin{aligned}-x + y &= -3.5 \\ x + 3y &= 9.5\end{aligned}$$

If (x, y) satisfies the system of equations above, what is the value of y ?

20 _____ **2**

$$\begin{aligned}ax + by &= 12 \\ 2x + 8y &= 60\end{aligned}$$

In the system of equations above, a and b are constants. If the system has infinitely many solutions, what is the value of $\frac{a}{b}$?

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SLOPE THEORY

1 7

$$x + y = 75$$

The equation above relates the number of minutes, x , Maria spends running each day and the number of minutes, y , she spends biking each day. In the equation, what does the number 75 represent?

- A) The number of minutes spent running each day
- B) The number of minutes spent biking each day
- C) The total number of minutes spent running and biking each day
- D) The number of minutes spent biking for each minute spent running

1 6

Salim wants to purchase tickets from a vendor to watch a tennis match. The vendor charges a one-time service fee for processing the purchase of the tickets. The equation $T = 15n + 12$ represents the total amount T , in dollars, Salim will pay for n tickets. What does 12 represent in the equation?

- A) The price of one ticket, in dollars
- B) The amount of the service fee, in dollars
- C) The total amount, in dollars, Salim will pay for one ticket
- D) The total amount, in dollars, Salim will pay for any number of tickets

3 2

A landscaping company estimates the price of a job, in dollars, using the expression $60 + 12nh$, where n is the number of landscapers who will be working and h is the total number of hours the job will take using n landscapers. Which of the following is the best interpretation of the number 12 in the expression?

- A) The company charges \$12 per hour for each landscaper.
- B) A minimum of 12 landscapers will work on each job.
- C) The price of every job increases by \$12 every hour.
- D) Each landscaper works 12 hours a day.

4 1

Kathy is a repair technician for a phone company. Each week, she receives a batch of phones that need repairs. The number of phones that she has left to fix at the end of each day can be estimated with the equation $P = 108 - 23d$, where P is the number of phones left and d is the number of days she has worked that week. What is the meaning of the value 108 in this equation?

- A) Kathy will complete the repairs within 108 days.
- B) Kathy starts each week with 108 phones to fix.
- C) Kathy repairs phones at a rate of 108 per hour.
- D) Kathy repairs phones at a rate of 108 per day.

6 1

$$h = 3a + 28.6$$

A pediatrician uses the model above to estimate the height h of a boy, in inches, in terms of the boy's age a , in years, between the ages of 2 and 5. Based on the model, what is the estimated increase, in inches, of a boy's height each year?

- A) 3
- B) 5.7
- C) 9.5
- D) 14.3

8 5

In air, the speed of sound S , in meters per second, is a linear function of the air temperature T , in degrees Celsius, and is given by $S(T) = 0.6T + 331.4$. Which of the following statements is the best interpretation of the number 331.4 in this context?

- A) The speed of sound, in meters per second, at 0°C
- B) The speed of sound, in meters per second, at 0.6°C
- C) The increase in the speed of sound, in meters per second, that corresponds to an increase of 1°C
- D) The increase in the speed of sound, in meters per second, that corresponds to an increase of 0.6°C

13 5

At a restaurant, n cups of tea are made by adding t tea bags to hot water. If $t = n + 2$, how many additional tea bags are needed to make each additional cup of tea?

- A) None
- B) One
- C) Two
- D) Three

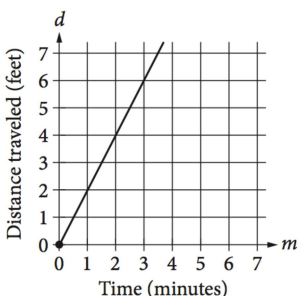
13 8

Oil and gas production in a certain area dropped from 4 million barrels in 2000 to 1.9 million barrels in 2013. Assuming that the oil and gas production decreased at a constant rate, which of the following linear functions f best models the production, in millions of barrels, t years after the year 2000?

- A) $f(t) = \frac{21}{130}t + 4$
- B) $f(t) = \frac{19}{130}t + 4$
- C) $f(t) = -\frac{21}{130}t + 4$
- D) $f(t) = -\frac{19}{130}t + 4$

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XY PLANES

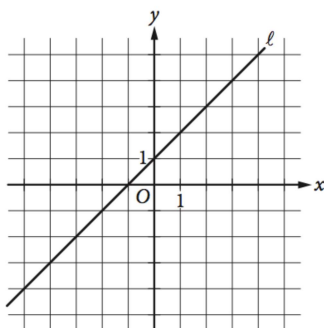
2 8



The graph above shows the distance traveled d , in feet, by a product on a conveyor belt m minutes after the product is placed on the belt. Which of the following equations correctly relates d and m ?

- A) $d = 2m$
- B) $d = \frac{1}{2}m$
- C) $d = m + 2$
- D) $d = 2m + 2$

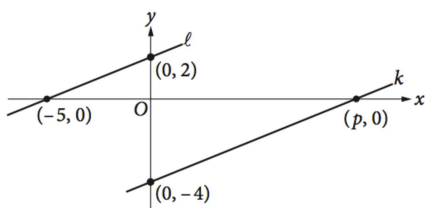
1 5



Which of the following is an equation of line ℓ in the xy -plane above?

- A) $x = 1$
- B) $y = 1$
- C) $y = x$
- D) $y = x + 1$

6 2

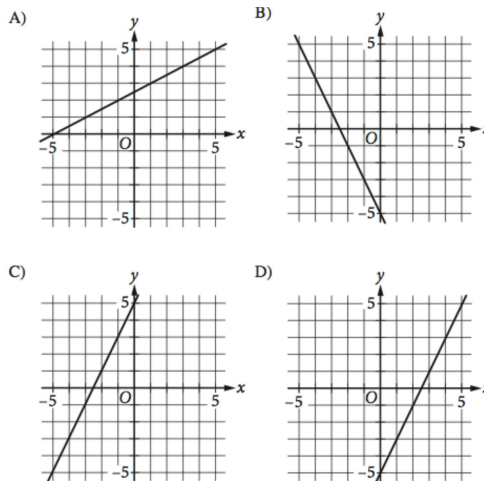


In the xy -plane above, line ℓ is parallel to line k . What is the value of p ?

- A) 4
- B) 5
- C) 8
- D) 10

5 6

Which of the following is the graph of the equation $y = 2x - 5$ in the xy -plane?



9 2

The graph of a line in the xy -plane has slope 2 and contains the point $(1, 8)$. The graph of a second line passes through the points $(1, 2)$ and $(2, 1)$. If the two lines intersect at the point (a, b) , what is the value of $a + b$?

- A) 4
- B) 3
- C) -1
- D) -4

12 1

A line in the xy -plane passes through the origin and has a slope of $\frac{1}{7}$. Which of the following points lies on the line?

- A) $(0, 7)$
- B) $(1, 7)$
- C) $(7, 7)$
- D) $(14, 2)$

19 7

The graph of a line in the xy -plane passes through the point $(1, 4)$ and crosses the x -axis at the point $(2, 0)$. The line crosses the y -axis at the point $(0, b)$. What is the value of b ?

2 6

A gardener buys two kinds of fertilizer. Fertilizer A contains 60% filler materials by weight and Fertilizer B contains 40% filler materials by weight. Together, the fertilizers bought by the gardener contain a total of 240 pounds of filler materials. Which equation models this relationship, where x is the number of pounds of Fertilizer A and y is the number of pounds of Fertilizer B?

- A) $0.4x + 0.6y = 240$
- B) $0.6x + 0.4y = 240$
- C) $40x + 60y = 240$
- D) $60x + 40y = 240$

3 1

On Saturday afternoon, Armand sent m text messages each hour for 5 hours, and Tyrone sent p text messages each hour for 4 hours. Which of the following represents the total number of messages sent by Armand and Tyrone on Saturday afternoon?

- A) $9mp$
- B) $20mp$
- C) $5m + 4p$
- D) $4m + 5p$

6 7

A company that makes wildlife videos purchases camera equipment for \$32,400. The equipment depreciates in value at a constant rate for 12 years, after which it is considered to have no monetary value. How much is the camera equipment worth 4 years after it is purchased?

- A) \$10,800
- B) \$16,200
- C) \$21,600
- D) \$29,700

8 7

Ken is working this summer as part of a crew on a farm. He earned \$8 per hour for the first 10 hours he worked this week. Because of his performance, his crew leader raised his salary to \$10 per hour for the rest of the week. Ken saves 90% of his earnings from each week. What is the least number of hours he must work the rest of the week to save at least \$270 for the week?

- A) 38
- B) 33
- C) 22
- D) 16

8 2

$$nA = 360$$

The measure A , in degrees, of an exterior angle of a regular polygon is related to the number of sides, n , of the polygon by the formula above. If the measure of an exterior angle of a regular polygon is greater than 50° , what is the greatest number of sides it can have?

- A) 5
- B) 6
- C) 7
- D) 8

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ENGLISH TO MATH

10 8

A group of 202 people went on an overnight camping trip, taking 60 tents with them. Some of the tents held 2 people each, and the rest held 4 people each. Assuming all the tents were filled to capacity and every person got to sleep in a tent, exactly how many of the tents were 2-person tents?

- A) 30
- B) 20
- C) 19
- D) 18

11 1

$$b = 2.35 + 0.25x$$

$$c = 1.75 + 0.40x$$

In the equations above, b and c represent the price per pound, in dollars, of beef and chicken, respectively, x weeks after July 1 during last summer. What was the price per pound of beef when it was equal to the price per pound of chicken?

- A) \$2.60
- B) \$2.85
- C) \$2.95
- D) \$3.35

16 2

The sales manager of a company awarded a total of \$3000 in bonuses to the most productive salespeople. The bonuses were awarded in amounts of \$250 or \$750. If at least one \$250 bonus and at least one \$750 bonus were awarded, what is one possible number of \$250 bonuses awarded?

16 5

Maria plans to rent a boat. The boat rental costs \$60 per hour, and she will also have to pay for a water safety course that costs \$10. Maria wants to spend no more than \$280 for the rental and the course. If the boat rental is available only for a whole number of hours, what is the maximum number of hours for which Maria can rent the boat?

19 8

A start-up company opened with 8 employees. The company's growth plan assumes that 2 new employees will be hired each quarter (every 3 months) for the first 5 years. If an equation is written in the form $y = ax + b$ to represent the number of employees, y , employed by the company x quarters after the company opened, what is the value of b ?

19 6

How many liters of a 25% saline solution must be added to 3 liters of a 10% saline solution to obtain a 15% saline solution?

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INEQUALITIES

7 5

Jackie has two summer jobs. She works as a tutor, which pays \$12 per hour, and she works as a lifeguard, which pays \$9.50 per hour. She can work no more than 20 hours per week, but she wants to earn at least \$220 per week. Which of the following systems of inequalities represents this situation in terms of x and y , where x is the number of hours she tutors and y is the number of hours she works as a lifeguard?

- A) $12x + 9.5y \leq 220$
 $x + y \geq 20$
- B) $12x + 9.5y \leq 220$
 $x + y \leq 20$
- C) $12x + 9.5y \geq 220$
 $x + y \leq 20$
- D) $12x + 9.5y \geq 220$
 $x + y \geq 20$

9 7

Marisa needs to hire at least 10 staff members for an upcoming project. The staff members will be made up of junior directors, who will be paid \$640 per week, and senior directors, who will be paid \$880 per week. Her budget for paying the staff members is no more than \$9,700 per week. She must hire at least 3 junior directors and at least 1 senior director. Which of the following systems of inequalities represents the conditions described if x is the number of junior directors and y is the number of senior directors?

- A) $640x + 880y \geq 9,700$
 $x + y \leq 10$
 $x \geq 3$
 $y \geq 1$
- B) $640x + 880y \leq 9,700$
 $x + y \geq 10$
 $x \geq 3$
 $y \geq 1$
- C) $640x + 880y \geq 9,700$
 $x + y \geq 10$
 $x \leq 3$
 $y \leq 1$
- D) $640x + 880y \leq 9,700$
 $x + y \leq 10$
 $x \leq 3$
 $y \leq 1$

10 6

Jaime is preparing for a bicycle race. His goal is to bicycle an average of at least 280 miles per week for 4 weeks. He bicycled 240 miles the first week, 310 miles the second week, and 320 miles the third week. Which inequality can be used to represent the number of miles, x , Jaime could bicycle on the 4th week to meet his goal?

- A) $\frac{240 + 310 + 320}{3} + x \geq 280$
- B) $240 + 310 + 320 \geq x(280)$
- C) $\frac{240}{4} + \frac{310}{4} + \frac{320}{4} + x \geq 280$
- D) $240 + 310 + 320 + x \geq 4(280)$

14 7

A shipping service restricts the dimensions of the boxes it will ship for a certain type of service. The restriction states that for boxes shaped like rectangular prisms, the sum of the perimeter of the base of the box and the height of the box cannot exceed 130 inches. The perimeter of the base is determined using the width and length of the box. If a box has a height of 60 inches and its length is 2.5 times the width, which inequality shows the allowable width x , in inches, of the box?

- A) $0 < x \leq 10$
- B) $0 < x \leq 11\frac{2}{3}$
- C) $0 < x \leq 17\frac{1}{2}$
- D) $0 < x \leq 20$

14 6

A laundry service is buying detergent and fabric softener from its supplier. The supplier will deliver no more than 300 pounds in a shipment. Each container of detergent weighs 7.35 pounds, and each container of fabric softener weighs 6.2 pounds. The service wants to buy at least twice as many containers of detergent as containers of fabric softener. Let d represent the number of containers of detergent, and let s represent the number of containers of fabric softener, where d and s are nonnegative integers. Which of the following systems of inequalities best represents this situation?

- A) $7.35d + 6.2s \leq 300$
 $d \geq 2s$
- B) $7.35d + 6.2s \leq 300$
 $2d \geq s$
- C) $14.7d + 6.2s \leq 300$
 $d \geq 2s$
- D) $14.7d + 6.2s \leq 300$
 $2d \geq s$

15 5

Alan drives an average of 100 miles each week. His car can travel an average of 25 miles per gallon of gasoline. Alan would like to reduce his weekly expenditure on gasoline by \$5. Assuming gasoline costs \$4 per gallon, which equation can Alan use to determine how many fewer average miles, m , he should drive each week?

- A) $\frac{25}{4}m = 95$
- B) $\frac{25}{4}m = 5$
- C) $\frac{4}{25}m = 95$
- D) $\frac{4}{25}m = 5$