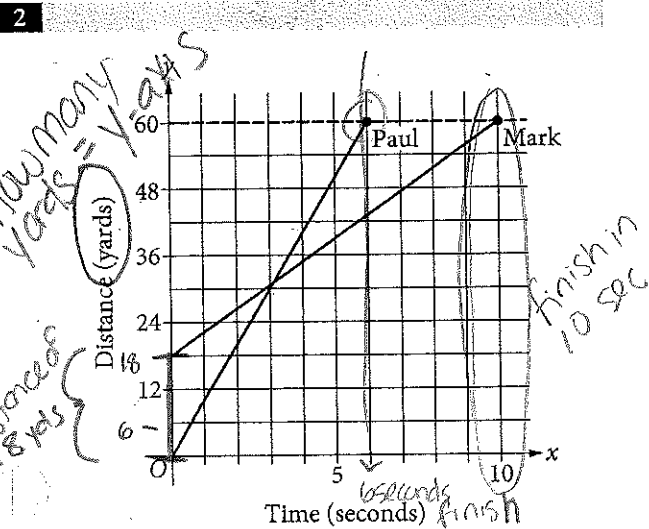


Name: Explanation      Period:               Date:         

<b>NUMBER CORRECT:</b>			
<b>Graphing</b>	<b>Linear</b>	<b>Solving</b>	<b>Systems of</b>
<b>Linear:</b>	<b>Models</b>	<b>Equations</b>	<b>Equations</b>

Show ALL Work For Credit

**GRAPHING LINEAR EQUATIONS**



The graph above shows the positions of Paul and Mark during a race. Paul and Mark each ran at a constant rate, and Mark was given a head start to shorten the distance he needed to run. Paul finished the race in 6 seconds, and Mark finished the race in 10 seconds. According to the graph, Mark was given a head start of how many yards?

- A) 3
- B) 12
- C) 18**
- D) 24

**35**

The line with the equation  $\frac{4}{5}x + \frac{1}{3}y = 1$  is graphed in the  $xy$ -plane. What is the  $x$ -coordinate of the  $x$ -intercept of the line?

means  $y=0$ , plug  $y=0$  into equation

$$\frac{4}{5}x + \frac{1}{3}(0) = 1$$

$$\frac{5}{4} \cdot \frac{4}{5}x = 1 \cdot \frac{5}{4}$$

$x = \frac{5}{4}$

**5**

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

A) B) C) D)

**4**

A website-hosting service charges businesses a onetime setup fee of \$350 plus  $d$  dollars for each month. If a business owner paid \$1,010 for the first 12 months, including the setup fee, what is the value of  $d$ ?

A) 25  
B) 35  
C) 45  
**D) 55**

$y = mx + b$   
 ↑ each month      ↑ one time

$$1010 = d(12) + 350$$

$$660 = d(12)$$

$55 = d$

# CREATING LINEAR MODELS

2

If  $y = kx$ , where  $k$  is a constant, and  $y = 24$  when  $x = 6$ , what is the value of  $y$  when  $x = 5$ ?

- A) 6
- B) 15
- C) 20**
- D) 23

• Find  $k$  first  
 $y = kx, y = 24, x = 6$   
 $24 = k \cdot 6$   
 $4 = k$   
 • If  $k = 4$  and  $x = 5$   
 $y = 4 \cdot 5$

6

$$h = 3a + 28.6$$

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

$h = 3a + 28.6$   
 ↑ change each year  
 ↑ starting height

35

$$a = 18t + 15$$

Jane made an initial deposit to a savings account. Each week thereafter she deposited a fixed amount to the account. The equation above models the amount  $a$ , in dollars, that Jane has deposited after  $t$  weekly deposits. According to the model, how many dollars was Jane's initial deposit? (Disregard the \$ sign when gridding your answer.)

$a = 18t + 15$   
 ↑ weekly deposit  
 ↑ starting value

**15**

Questions 9 and 10 refer to the following information.

speed  $a = 1,052 + 1.08t$  fmp

The speed of a sound wave in air depends on the air temperature. The formula above shows the relationship between  $a$ , the speed of a sound wave, in feet per second, and  $t$ , the air temperature, in degrees Fahrenheit ( $^{\circ}\text{F}$ ).

9

Which of the following expresses the air temperature in terms of the speed of a sound wave?

- A)  $t = \frac{a - 1,052}{1.08}$**
- B)  $t = \frac{a + 1,052}{1.08}$
- C)  $t = \frac{1,052 - a}{1.08}$
- D)  $t = \frac{1.08}{a + 1,052}$

wants  $t =$   
 $a = 1052 + 1.08t$   
 $a - 1052 = 1.08t$   
 $\frac{a - 1052}{1.08} = t$

10

At which of the following air temperatures will the speed of a sound wave be closest to 1,000 feet per second?

- A)  $-46^{\circ}\text{F}$
- B)  $-48^{\circ}\text{F}$**
- C)  $-49^{\circ}\text{F}$
- D)  $-50^{\circ}\text{F}$

Speed = 1000  
 $a = 1000$   
 $1000 = 1052 + 1.08t$   
 $-52 = 1.08t$   
 $-48.1 = t$

# SOLVING EQUATIONS

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

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

$$\frac{x-1}{3} = 3$$

$$\left(\frac{3}{1}\right) \left(\frac{x-1}{3}\right) = 3 \cdot \frac{3}{1}$$

$$\begin{array}{r} x-1 = 9 \\ +1 \quad +1 \end{array}$$

$$\boxed{x = 10}$$

If  $16 + 4x$  is 10 more than 14, what is the value of  $8x$ ?

- A) 2
- B) 6
- C) 16**
- D) 80

$$= 14 + 10 = 24$$

$$16 + 4x = 14 + 10$$

$$16 + 4x = 24$$

$$4x = 8$$

$$x = 2$$

Substitute into  $8x$

$$8(2) = 16$$

If  $\frac{a}{b} = 2$ , what is the value of  $\frac{4b}{a}$ ?

- A) 0
- B) 1
- C) 2**
- D) 4

$$\frac{a}{b} = 2$$

$$\frac{a}{a} = \frac{2b}{a}$$

$$1 = \frac{2b}{a} \quad \text{but I want } \frac{4b}{a}$$

$$2 \cdot 1 = \frac{2b}{a} \cdot 2$$

$$2 = \frac{4b}{a}$$

12

$$R = \frac{F}{N+F}$$

A website uses the formula above to calculate a seller's rating,  $R$ , based on the number of favorable reviews,  $F$ , and unfavorable reviews,  $N$ . Which of the following expresses the number of favorable reviews in terms of the other variables?

A)  ~~$F = \frac{RN}{R-1}$~~

**B)  $F = \frac{RN}{1-R}$**

C)  ~~$F = \frac{N}{1-R}$~~

D)  ~~$F = \frac{N}{R-1}$~~

$$\left(\frac{N+F}{1}\right)R = \frac{F}{N+F} \left(\frac{N+F}{1}\right)$$

$$(N+F)R = F$$

$$NR + FR = F$$

$$NR = F - FR$$

$$NR = F(1-R)$$

CROSS OFF ANSWER WITH OUT NR

CROSS OFF ANSWERS WITH OUT 1-R

$$\boxed{\frac{NR}{1-R} = F}$$

# SYSTEMS OF LINEAR EQUATIONS

9

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

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

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

$$\begin{aligned} 3x + 4y &= -23 & (1) \\ -x + 2y &= -19 & \times 3 \\ \hline -3x + 6y &= -57 & (2) \end{aligned}$$

$$\begin{aligned} (1) + (2) &\Rightarrow 10y = -80 \\ y &= -8 \end{aligned}$$

11

$$\begin{aligned} b &= 2.35 + 0.25x \\ c &= 1.75 + 0.40x \end{aligned}$$

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

where  $b = c$

$$\begin{aligned} 2.35 + 0.25x &= 1.75 + 0.40x \\ 0.6 &= 0.15x \\ 4 &= x \end{aligned}$$

$$\Rightarrow b = 2.35 + 0.25(4) = 3.35$$

31

A group of friends decided to divide the \$800 cost of a trip equally among themselves. When two of the friends decided not to go on the trip, those remaining still divided the \$800 cost equally, but each friend's share of the cost increased by \$20. How many friends were in the group originally?

$n$ : number of friends

$c$ : cost per person

$$\frac{800}{n} = c$$

$$\frac{800}{n-2} = c + 20$$

plug "c" in equation

$$\frac{800}{n-2} = \frac{800}{n} + 20$$

$$\begin{aligned} 800n &= 800(n-2) + 20(n-2)n \\ 800n &= 800n - 1600 + 20n^2 - 40n \end{aligned}$$

$$0 = 20n^2 - 40n - 1600$$

$$\begin{aligned} n &= 10 \\ n &= -8 \end{aligned} \Rightarrow \boxed{n = 10}$$

19

A food truck sells salads for \$6.50 each and drinks for \$2.00 each. The food truck's revenue from selling a total of 209 salads and drinks in one day was \$836.50. How many salads were sold that day?

- A) 77  
 B) 93  
 C) 99  
 D) 105

$s$  = salad

$d$  = drink

$$6.5s + 2d = 836.50 \quad (1)$$

$$(s + d = 209) \cdot 2$$

$$2s + 2d = 418 \quad (2)$$

$$(1) - (2) \Rightarrow 6.5s - 2s = 418.5$$

$$4.5s = 418.5$$

$$s = 93$$