1. Calculate the slope m of a line passing through the points $(-1, -8)$ and $(-5, -9)$

A. $-\frac{1}{4}$

B. $\frac{1}{4}$

C. 1

D. $\frac{7}{12}$

E. $-\frac{1}{2}$

F. $-\frac{5}{12}$

G. Undefined

H. 1

2. The water tank on a firetruck holds 1400 gal of water. This water is used so the firefighters can begin pumping water as soon as they arrive at a fire. The volume of water remaining in the tank x seconds after the pump has been turned on is displayed in the table.

x seconds	y gallons
0	1400
7	1274
14	1148
21	1022
28	896

(a.) Determine the rate of change of the volume with respect to time. (b.) Interpret the meaning of this value. (c.) At this rate, how long do the firefighters have to connect to a hydrant before the water in the tank runs out? **Caution: be careful with units.**

A. (a.) The rate of change is -23 gallons/minute. (b.) This means that for every minute the hose is turned on, the volume of water in the tank will decrease by 23 gallons. (c.) The firefighters have about 79.8 minutes before they must connect to a hydrant.

B. (a.) The rate of change is -21 gallons/second. (b.) This means that for every second the hose is turned on, the volume of water in the tank will decrease by 21 gallons. (c.) The firefighters have about 80.8 seconds before they must connect to a hydrant.

C. (a.) The rate of change is -13 gallons/second. (b.) This means that for every second the hose is turned on, the volume of water in the tank will decrease by 13 gallons. (c.) The firefighters have about 82.8 seconds before they must connect to a hydrant.

D. (a.) The rate of change is -23 gallons/second. (b.) This means that for every second the hose is turned on, the volume of water in the tank will decrease by 23 gallons. (c.) The firefighters have about 79.8 seconds before they must connect to a hydrant.

E. (a.) The rate of change is -21 gallons/minute. (b.) This means that for every minute the hose is turned on, the volume of water in the tank will decrease by 21 gallons. (c.) The firefighters have about 80.8 minutes before they must connect to a hydrant.

F. (a.) The rate of change is -18 gallons/minute. (b.) This means that for every minute the hose is turned on, the volume of water in the tank will decrease by 18 gallons. (c.) The firefighters have about 77.8 minutes before they must connect to a hydrant.

G. (a.) The rate of change is -18 gallons/second. (b.) This means that for every second the hose is turned on, the volume of water in the tank will decrease by 18 gallons. (c.) The firefighters have about 77.8 seconds before they must connect to a hydrant.

H. (a.) The rate of change is -13 gallons/minute. (b.) This means that for every minute the hose is turned on, the volume of water in the tank will decrease by 13 gallons. (c.) The firefighters have about 82.8 minutes before they must connect to a hydrant.

3. Write the equation of a line having slope $\frac{1}{2}$ and y-intercept $(0, \frac{3}{5})$.

A. The equation of a line having slope $\frac{1}{2}$ and y-intercept $(0, \frac{3}{5})$ is $y = 2x + \frac{5}{3}$.

B. The equation of a line having slope $\frac{1}{2}$ and y-intercept $(0, \frac{3}{5})$ is $y = 2x + \frac{3}{5}$.

C. The equation of a line having slope $\frac{1}{2}$ and y-intercept $(0, \frac{3}{5})$ is $y = \frac{1}{2}x + \frac{5}{3}$.

D. The equation of a line having slope $\frac{1}{2}$ and y-intercept $(0, \frac{3}{5})$ is $y = \frac{1}{2}x + \frac{3}{5}$.

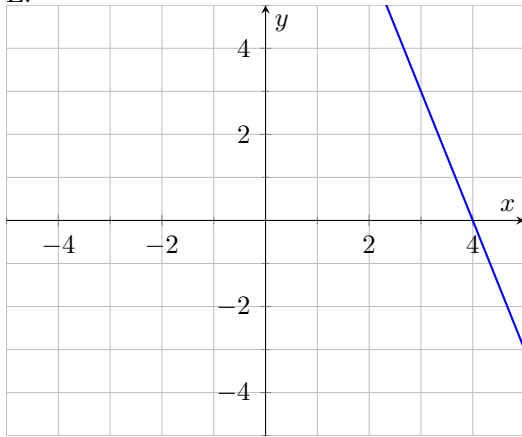4. Using the point-slope form, graph the line $y - 3 = -3(x - 3)$.

A.

B.

C.
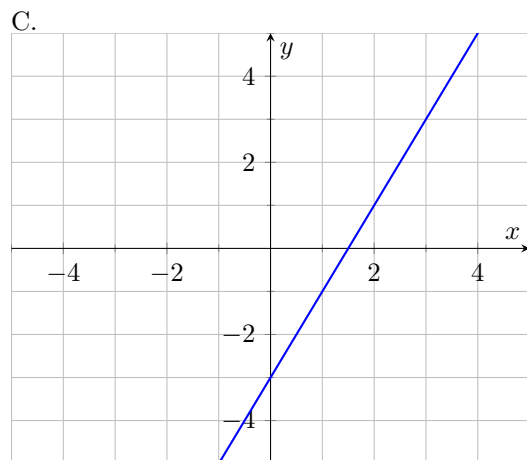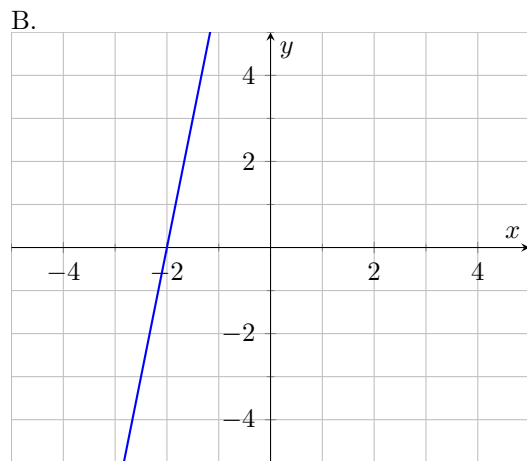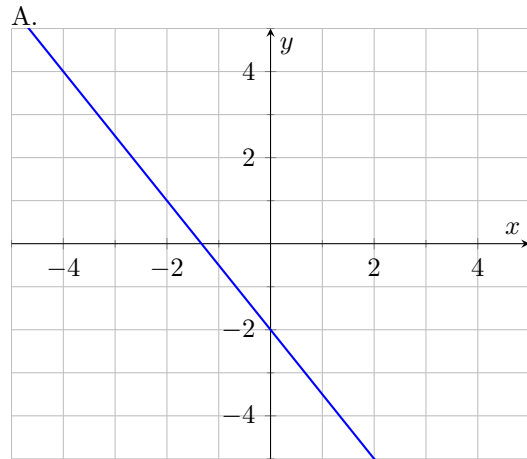
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D.
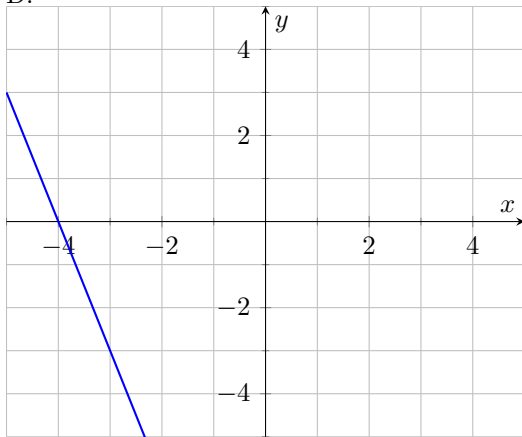
E.

5. Use the slope-intercept form of each line to determine the number of solutions of the system $\left\{ \begin{array}{l} y = -2x - 1 \\ y = -x + 2 \end{array} \right\}$; then classify each system as a consistent system of independent equations, an inconsistent system, or a consistent system of dependent equations.

A. The system has infinitely many solutions. Therefore, it is an inconsistent system of dependent equations.

B. The system has two solutions. Therefore, it is a consistent system of independent equations.

C. The system has two solutions. Therefore, it is a inconsistent system of dependent equations.

D. The system has one solution. Therefore, it is a consistent system of independent equations.

E. The system has no solutions. Therefore, it is a consistent system of independent equations.

F. The system has one solution. Therefore, it is an inconsistent system of dependent equations.

G. The system has no solutions. Therefore, it is an inconsistent system of equations.

H. The system has infinitely many solutions. Therefore, it is a consistent system of dependent equations.

6. Use the slope-intercept form of each line to determine the number of solutions of the system $\left\{ \begin{array}{l} y = \frac{5}{2}x + 3 \\ y = 3.5x + 2 \end{array} \right\}$; then classify each system as a consistent system of independent equations, an inconsistent system, or a consistent system of dependent equations.

A. The system has two solutions. Therefore, it is a consistent system of independent equations.

B. The system has no solutions. Therefore, it is an inconsistent system of equations.

C. The system has no solutions. Therefore, it is a consistent system of independent equations.

D. The system has two solutions. Therefore, it is a inconsistent system of dependent equations.

E. The system has one solution. Therefore, it is an inconsistent system of dependent equations.

F. The system has one solution. Therefore, it is a consistent system of independent equations.

G. The system has infinitely many solutions. Therefore, it is a consistent system of dependent equations.

H. The system has infinitely many solutions. Therefore, it is an inconsistent system of dependent equations.

7. Solve the following linear system by substitution. $\begin{cases} 3x - y = -4 \\ 9x - 3y = -12 \end{cases}$

A. $(-5, 0)$.

B. There is no solution.

C. $(-4, 1)$.

D. $(-2, 3)$.

E. There are infinitely many solutions.

F. $(2, 7)$.

G. $(0, 5)$.

H. $(1, 6)$.

8. Solve the following linear system by substitution. $\left\{ \begin{array}{l} -x - 3y = -3 \\ -3x - 9y = 0 \end{array} \right\}$

A. $(2, 6)$.

B. $(-5, -1)$.

C. $(0, 4)$.

D. $(3, 7)$.

E. $(-4, 0)$.

F. $(1, 5)$.

G. There are infinitely many solutions.

H. There is no solution.

9. The sum of thrice one number and thrice a second number is 9. The sum of two times one number and a second number is 7. Write a system of equations which models this situation.

A. The system is $\left\{ \begin{array}{l} x - 2y = 9 \\ 3x + 2y = 7 \end{array} \right\}$.

B. The system is $\left\{ \begin{array}{l} 3x + 3y = 9 \\ x - 2y = 7 \end{array} \right\}$.

C. The system is $\left\{ \begin{array}{l} x - 4y = 9 \\ 2x - 3y = 7 \end{array} \right\}$.

D. The system is $\left\{ \begin{array}{l} 3x + 3y = 9 \\ 2x + y = 7 \end{array} \right\}$.

E. The system is $\left\{ \begin{array}{l} 4x - 2y = 9 \\ 3x - 3y = 7 \end{array} \right\}$.

F. The system is $\left\{ \begin{array}{l} 2x + 4y = 9 \\ 4x - 2y = 7 \end{array} \right\}$.

G. The system is $\left\{ \begin{array}{l} 2x - y = 9 \\ x + 3y = 7 \end{array} \right\}$.

H. The system is $\left\{ \begin{array}{l} 2x + 2y = 9 \\ x - 3y = 7 \end{array} \right\}$.

10. Solve the following linear system by the addition method. $\left\{ \begin{array}{l} 6x - 6y = -2 \\ -2x - 2y = -1 \end{array} \right\}$

A. $\left(\frac{25}{12}, \frac{29}{12} \right)$.

B. $\left(\frac{37}{12}, \frac{41}{12} \right)$.

C. $\left(-\frac{11}{12}, -\frac{7}{12} \right)$.

D. $\left(-\frac{35}{12}, -\frac{31}{12} \right)$.

E. There is no solution.

F. $\left(-\frac{47}{12}, -\frac{43}{12} \right)$.

G. There are infinitely many solutions.

H. $\left(\frac{1}{12}, \frac{5}{12} \right)$.

11. Billy Ray (Billy Bob's cousin) made an investment of $16000. One part of the investement went into a bond fund which paid a rate of 3 percent per year, and the rest of the investment went into stocks which earn interest at a rate of 9 percent per year. The combined interest earned at the end of 1 year was $1135. How much was invested at each rate?

A. They invested $12350 in bonds and $3650 in stocks.

B. They invested $7000 in bonds and $9000 in stocks.

C. They invested $10217 in bonds and $5783 in stocks.

D. They invested $2400 in bonds and $13600 in stocks.

E. They invested $10033 in bonds and $5967 in stocks.

F. They invested $5083 in bonds and $10917 in stocks.

G. They invested $6717 in bonds and $9283 in stocks.

H. They invested $10833 in bonds and $5167 in stocks.

12. A jet plane and a refueling plane that are 525 mi apart head toward each other so that the jet can refuel. The jet flies 250 mi/h faster than the tanker. Suppose they meet in 45 minutes. Letting r_1 be the speed of the jet, and r_2 be the speed of the refueller, write a system of equations which models this situation. (Warning: Use consistent units of measurement.)

A. The system is $\left\{ \begin{array}{c} r_1 = r_2 + 250 \\ 45r_1 + 45r_2 = 525 \end{array} \right\}$.

B. The system is $\left\{ \begin{array}{c} r_1 + r_2 = 250 \\ 45r_1 + 45r_2 = 525 \end{array} \right\}$.

C. The system is $\left\{ \begin{array}{c} r_1 = r_2 + 250 \\ 45r_1 + 45r_2 = 45 \cdot 525 \end{array} \right\}$.

D. The system is $\left\{ \begin{array}{c} r_1 = r_2 + 250 \\ \frac{3}{4}r_1 + \frac{3}{4}r_2 = 525 \end{array} \right\}$.

E. The system is $\left\{ \begin{array}{c} r_1 = r_2 + 250 \\ \frac{3}{4}r_1 + \frac{3}{4}r_2 = \frac{3}{4} \cdot 525 \end{array} \right\}$.

F. The system is $\left\{ \begin{array}{c} r_1 + r_2 = 250 \\ 45r_1 + 45r_2 = 45 \cdot 525 \end{array} \right\}$.

G. The system is $\left\{ \begin{array}{c} r_1 + r_2 = 250 \\ \frac{3}{4}r_1 + \frac{3}{4}r_2 = 525 \end{array} \right\}$.

H. The system is $\left\{ \begin{array}{c} r_1 + r_2 = 250 \\ \frac{3}{4}r_1 + \frac{3}{4}r_2 = \frac{3}{4} \cdot 525 \end{array} \right\}$.

13. Solve the following linear inequality $x - 2 < 4x - 1$.

A. $-\frac{1}{9} < x$

B. $\frac{1}{6} < x$

C. $-\frac{4}{3} < x$

D. $x > \frac{1}{12}$

E. $x > \frac{1}{3}$

F. $x > -\frac{1}{3}$

G. $\frac{1}{9} < x$

H. $x > -1$

14. Solve the following linear inequality $4(-3x - 2) < 5(-4x - 1)$.

A. $x < \frac{9}{8}$
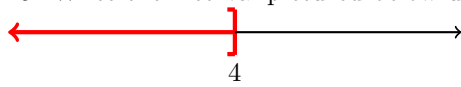
B. $x < -\frac{3}{16}$

C. $x > -\frac{1}{8}$

D. $x < \frac{3}{8}$

E. $x < -\frac{3}{4}$

F. $x > \frac{3}{2}$

G. $x > -\frac{3}{2}$

H. $x > -\frac{3}{32}$

15. Write the interval pictured below using inequality symbols.

4

A. $x \leq 4$

B. $x \geq 4$

C. $x < 4$

D. $x > 4$

16. Solve the following linear inequality $5 \leq -5x + 1$.

A. $\frac{4}{15} \geq x$

B. $x \leq \frac{1}{5}$

C. $-\frac{8}{5} \geq x$

D. $x \leq \frac{8}{5}$

E. $x \leq -\frac{4}{5}$

F. $x \leq -\frac{4}{15}$

G. $\frac{4}{5} \geq x$

H. $x \leq \frac{2}{5}$

17. Solve the following linear inequality $2x + 1 \geq -3$ AND $4x - 4 < 0$.

A. The inequality is true for all values of x. Therefore, it is a contradiction.

B. $0 < x < 3$

C. $1 < x \leq -2$

D. $-2 \leq x < 1$

E. $-2 < x < 1$

F. $x \geq 2$ OR $x < 5$

G. $3 < x < 0$

H. $1 \leq x \leq -2$

18. Solve the following linear inequality $-5x - 2 < -3x - 5 \leq -5x + 4$.

A. $\frac{9}{2} \leq x < \frac{3}{2}$

B. $1 < x \leq 4$

C. $4 \leq x < 1$

D. $\frac{3}{2} < x \leq \frac{9}{2}$

E. $2 < x \leq 5$

F. $5 \leq x < 2$

G. $\frac{11}{2} < x \leq \frac{17}{2}$

H. $\frac{17}{2} \leq x < \frac{11}{2}$

19. Solve the following equation $|-3x + 5| = 2$.

A. 2 or $-\frac{7}{6}$

B. $-\frac{1}{3}$ or -7

C. $\frac{1}{3}$ or $-\frac{28}{3}$

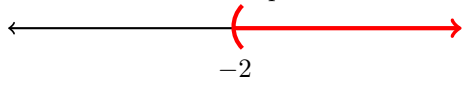D. $-\frac{1}{4}$ or $\frac{28}{3}$

E. 1 or $\frac{7}{3}$

F. -2 or $\frac{7}{6}$

G. $\frac{1}{4}$ or 7

H. $\frac{1}{2}$ or $\frac{7}{12}$

20. Write the interval pictured below using interval notation.

$$-2$$

A. $(-2, \infty)$

B. $[-2, \infty)$

C. $(-\infty, -2)$

D. $(-\infty, -2]$

E. $(\infty, -2)$

F. $(\infty, -2]$

Answers

1. B.

2. G.

3. D.

4. E.

5. D.

6. F.

7. E.

8. H.

9. D.

10. H.

11. F.

12. D.

13. F.

14. D.

15. A.

16. E.

17. D.

18. D.

19. E.

20. A.