

1. A linear equation gives the production cost in dollars ( $y$ ) in terms of the number of units produced ( $x$ ). The slope of this line is 10. Interpret the meaning of this rate of change.

- A. The number of dollars can be expressed as each unit produced divided by 10.
- B. The number of dollars is always equal to each unit produced times 10.
- C. For every additional unit produced, we can expect an decrease of 10 dollars.
- D. For every additional unit produced, we can expect an increase of 10 dollars.

2. Calculate the slope of a line which is parallel to the line passing through the points  $(8, -6)$  and  $(-4, 3)$

A. 3

B.  $-\frac{19}{12}$

C.  $-\frac{5}{4}$

D. Undefined

E. -3

F.  $-\frac{7}{12}$

G.  $-\frac{17}{12}$

H.  $-\frac{3}{4}$

3. Solve the following linear inequality  $-2 > 2x + 4$ .

A.  $\frac{3}{4} > x$

B.  $x < -3$

C.  $x < 12$

D.  $9 > x$

E.  $x < -12$

F.  $3 > x$

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

H.  $-\frac{3}{4} > x$

4. Solve the following linear inequality  $5(-x - 3) \geq 0(x + 3)$ .

A.  $x \leq 3$

B.  $x \geq 9$

C.  $x \leq 12$

D.  $x \geq -9$

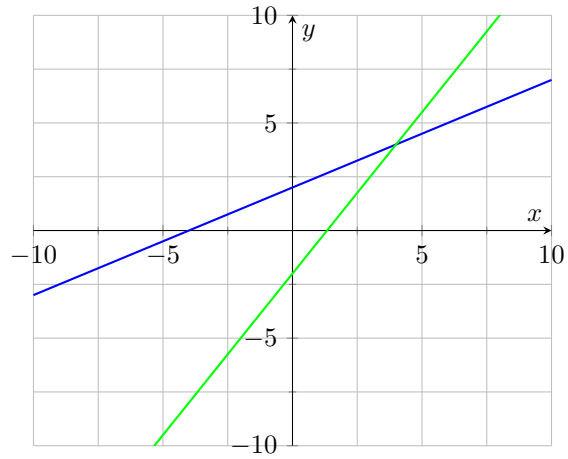
E.  $x \leq -3$

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

G.  $x \leq \frac{3}{4}$

H.  $x \leq -6$

5. Below is a graph of the system of linear equations  $\begin{cases} y = \frac{1}{2}x + 2 \\ y = \frac{3}{2}x - 2 \end{cases}$ . Use this graph to solve the linear inequality  $\frac{1}{2}x + 2 \geq \frac{3}{2}x - 2$ .



- A.  $x \leq 7$
- B.  $x \geq 5$
- C.  $x \geq 7$
- D.  $x \leq 5$
- E.  $x \leq 4$
- F.  $x \geq 4$

6. Solve the following linear inequality  $-4(2) \geq -2(-5x - 3)$ .

A.  $x \leq -\frac{28}{5}$

B.  $x \leq \frac{14}{5}$

C.  $x \geq -\frac{7}{15}$

D.  $x \geq \frac{7}{15}$

E.  $x \geq -\frac{7}{10}$

F.  $x \leq -\frac{7}{5}$

G.  $x \geq \frac{7}{10}$

H.  $x \leq \frac{7}{20}$

7. Solve the following equation  $|-5x - 1| = 4$ .

A.  $-1$  or  $\frac{3}{5}$

B.  $-\frac{1}{2}$  or  $-\frac{9}{5}$

C.  $4$  or  $\frac{1}{5}$

D.  $2$  or  $-\frac{1}{5}$

E.  $\frac{1}{2}$  or  $\frac{9}{5}$

F.  $-\frac{1}{4}$  or  $-\frac{3}{10}$

G.  $-2$  or  $\frac{3}{20}$

H.  $\frac{1}{4}$  or  $-\frac{3}{20}$

8. Solve the following inequality  $|-2(3x - 1) - 4(4x - 5)| \geq 1$ .

A.  $\frac{21}{22} \leq x \leq \frac{23}{22}$

B.  $x \leq -\frac{7}{22}$  or  $x \geq \frac{46}{11}$

C.  $-\frac{63}{22} \leq x \leq \frac{23}{11}$

D.  $x \leq \frac{21}{22}$  or  $x \geq \frac{23}{22}$

E.  $\frac{63}{22} \leq x \leq \frac{69}{22}$

F.  $x \leq -\frac{63}{22}$  or  $x \geq \frac{23}{11}$

G.  $-\frac{7}{22} \leq x \leq \frac{46}{11}$

H.  $x \leq \frac{63}{22}$  or  $x \geq \frac{69}{22}$



9. A jet plane and a refueling plane that are 575 mi apart head toward each other so that the jet can refuel. The jet flies 250 mi/h faster than the tanker. Determine the speed of each aircraft if they meet in 50 minutes. Round your answer to the nearest mile per hour. (Hint: Use consistent units of measurement.)

- A. The jet's speed is 515 mi/hr, and the refueler's speed is 265mi/hr.
- B. The jet's speed is 500 mi/hr, and the refueler's speed is 250mi/hr.
- C. The jet's speed is 425 mi/hr, and the refueler's speed is 175mi/hr.
- D. The jet's speed is 440 mi/hr, and the refueler's speed is 190mi/hr.
- E. The jet's speed is 530 mi/hr, and the refueler's speed is 280mi/hr.
- F. The jet's speed is 485 mi/hr, and the refueler's speed is 235mi/hr.
- G. The jet's speed is 470 mi/hr, and the refueler's speed is 220mi/hr.
- H. The jet's speed is 455 mi/hr, and the refueler's speed is 205mi/hr.

10. A small boat can go 21 km downstream in 1.5 hr but only 17 km upstream in 1.5 hr. Determine the rate of the boat and the rate of the current.

- A. The speed of the boat is 12.9 km/hr and the speed of the current is 1.8 km/hr.
- B. The speed of the boat is 12.7 km/hr and the speed of the current is 1.3 km/hr.
- C. The speed of the boat is 13 km/hr and the speed of the current is 1.7 km/hr.
- D. The speed of the boat is 11.9 km/hr and the speed of the current is 0.9 km/hr.
- E. The speed of the boat is 13.2 km/hr and the speed of the current is 1 km/hr.
- F. The speed of the boat is 12.4 km/hr and the speed of the current is 0.5 km/hr.
- G. The speed of the boat is 13.5 km/hr and the speed of the current is 1.5 km/hr.
- H. The speed of the boat is 13.1 km/hr and the speed of the current is 2.1 km/hr.

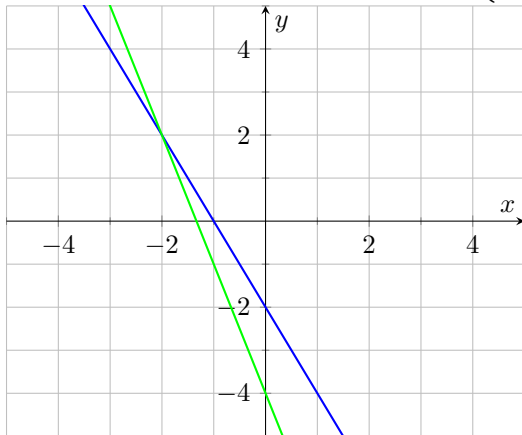
11. Use the table below for the system of two linear equations,  $y_1 = m_1x + b_1$  and  $y_2 = m_2x + b_2$  to classify the system as a consistent system of independent equations, an inconsistent system, or a consistent system

$x$	$y_1$	$y_2$
-5	-0.5	-1.5
-4.5	-0.25	-1.25
-4	0	-1
-3.5	0.25	-0.75
-3	0.5	-0.5
-2.5	0.75	-0.25
-2	1	0
-1.5	1.25	0.25
-1	1.5	0.5
-0.5	1.75	0.75
0	2	1
0.5	2.25	1.25
1	2.5	1.5
1.5	2.75	1.75
2	3	2
2.5	3.25	2.25
3	3.5	2.5
3.5	3.75	2.75
4	4	3
4.5	4.25	3.25
5	4.5	3.5

of dependent equations.

- A. The system has two solutions. Therefore, it is a inconsistent system of dependent equations.
- B. The system has infinitely many solutions. Therefore, it is a consistent system of dependent equations.
- C. The system has one solution. Therefore, it is an inconsistent system of dependent equations.
- D. The system has no solutions. Therefore, it is an inconsistent system of equations.
- E. The system has one solution. Therefore, it is a consistent system of independent equations.
- F. The system has infinitely many solutions. Therefore, it is an inconsistent system of dependent equations.
- G. The system has two solutions. Therefore, it is a consistent system of independent equations.
- H. The system has no solutions. Therefore, it is a consistent system of independent equations.

12. Solve the system of linear equations  $\begin{cases} -6x - 2y = 8 \\ -2x - y = 2 \end{cases}$  by using the graph below.



- A.  $(-5, -1)$ .
- B.  $(-2, 2)$ .
- C.  $(-4, 0)$ .
- D.  $(-3, 1)$ .
- E.  $(1, 5)$ .
- F.  $(0, 4)$ .

13. Solve the following linear inequality  $4x + 4 \geq 3$  OR  $2x + 5 \leq -4$ .

A.  $x \geq -\frac{1}{2}$  OR  $x \leq -\frac{19}{4}$

B.  $x \geq -\frac{1}{4}$  OR  $x \leq -\frac{9}{2}$

C.  $x \geq \frac{1}{4}$  OR  $x \leq -4$

D.  $x \leq \frac{1}{4}$  OR  $x \geq -4$

E.  $x \leq -\frac{1}{2}$  OR  $x \geq -\frac{19}{4}$

F. The inequality is true for all values of  $x$ . Therefore, it is an unconditional inequality.

G.  $x \geq -\frac{7}{12}$  OR  $x \leq -\frac{29}{6}$

H.  $x \leq -\frac{1}{4}$  OR  $x \geq -\frac{9}{2}$

14. Solve the following linear inequality  $4x + 3 > -3$  OR  $2x + 2 < 5$  and express your answer in interval notation.

A.  $x \in (-\infty, -\frac{7}{4}) \cap (\frac{5}{4}, \infty)$

B.  $x \in (-\infty, 2) \cap (-1, \infty)$

C.  $x \in (-\infty, \frac{3}{2}) \cap (-\frac{3}{2}, \infty)$

D.  $x \in (-\infty, -\frac{7}{4}) \cup (\frac{5}{4}, \infty)$

E.  $x \in (-\infty, \frac{11}{2}) \cap (\frac{5}{2}, \infty)$

F.  $x \in \mathbb{R} = (-\infty, \infty)$

G.  $x \in (-\infty, \frac{5}{2}) \cup (\frac{11}{2}, \infty)$

H.  $x \in (-\infty, -1) \cup (2, \infty)$

15. Determine the slope and  $y$ -intercept of the line  $-6x - 8y = 1$ .

A. The slope is  $-\frac{1}{8}$  and the  $y$ -intercept is  $(0, -\frac{3}{4})$ .

B. The slope is  $(0, -\frac{1}{8})$  and the  $y$ -intercept is  $-\frac{3}{4}$ .

C. The slope is  $-\frac{1}{8}$  and the  $y$ -intercept is  $(0, -\frac{4}{3})$ .

D. The slope is  $-\frac{4}{3}$  and the  $y$ -intercept is  $(0, -\frac{1}{8})$ .

E. The slope is  $(0, -\frac{4}{3})$  and the  $y$ -intercept is  $-\frac{1}{8}$ .

F. The slope is  $-\frac{3}{4}$  and the  $y$ -intercept is  $(0, -\frac{1}{8})$ .

G. The slope is  $(0, -\frac{1}{8})$  and the  $y$ -intercept is  $-\frac{4}{3}$ .

H. The slope is  $(0, -\frac{3}{4})$  and the  $y$ -intercept is  $-\frac{1}{8}$ .

16. Determine the slope and  $y$ -intercept of the line  $f(x) = 6x$ ?

- A. The slope is  $(0, 0)$  and the  $y$ -intercept is 6.
- B. The  $y$ -intercept is undefined.
- C. The slope is  $(0, 6)$  and the  $y$ -intercept is 0.
- D. The  $y$ -intercept is undefined, but the slope is 0.
- E. The slope is 6, but the  $y$ -intercept is undefined.
- F. There is not enough information to determine the slope and  $y$ -intercept.
- G. Both the slope and the  $y$ -intercept are undefined.
- H. The slope is 6 and the  $y$ -intercept is  $(0, 0)$ .



17. Solve the following linear system by substitution.  $\left\{ \begin{array}{l} \frac{x}{9} + \frac{y}{8} = -\frac{1}{18} \\ -\frac{x}{4} - \frac{y}{4} = 0 \end{array} \right\}$

A.  $(7, -1)$ .

B.  $(0, -8)$ .

C.  $(6, -2)$ .

D.  $(2, -6)$ .

E. There is no solution.

F. There are infinitely many solutions.

G.  $(5, -3)$ .

H.  $(4, -4)$ .

18. Find two numbers whose sum is 115 and whose difference is 82.

A. The first number is 95.5 and the second number is 19.5.

B. The first number is 102.5 and the second number is 12.5.

C. The first number is 96.5 and the second number is 18.5.

D. The first number is 101.5 and the second number is 13.5.

E. The first number is 98.5 and the second number is 16.5.

F. The first number is 94.5 and the second number is 20.5.

G. The first number is 97.5 and the second number is 17.5.

H. The first number is 99.5 and the second number is 15.5.

19. Solve the following linear system by the addition method.  $\begin{cases} 6x - 2y = 2 \\ 2x - 2y = -4 \end{cases}$

A.  $(\frac{7}{2}, \frac{11}{2})$ .

B. There is no solution.

C.  $(\frac{5}{2}, \frac{9}{2})$ .

D.  $(\frac{9}{2}, \frac{13}{2})$ .

E.  $(\frac{1}{2}, \frac{5}{2})$ .

F.  $(\frac{3}{2}, \frac{7}{2})$ .

G.  $(-\frac{5}{2}, -\frac{1}{2})$ .

H. There are infinitely many solutions.

20. Solve the following linear system by the addition method.  $\left\{ \begin{array}{l} -\frac{x}{7} - \frac{y}{6} = \frac{1}{7} \\ \frac{x}{4} + \frac{y}{3} = \frac{1}{4} \end{array} \right\}$

A.  $(-18, 9)$ .

B.  $(-11, 16)$ .

C.  $(-13, 14)$ .

D.  $(-19, 8)$ .

E. There are infinitely many solutions.

F.  $(-15, 12)$ .

G.  $(-16, 11)$ .

H. There is no solution.

## Answers

1. D.
2. H.
3. B.
4. E.
5. E.
6. F.
7. A.
8. D.
9. G.
10. B.
11. D.
12. B.
13. B.
14. F.
15. F.
16. H.
17. H.
18. E.
19. F.
20. F.