

Linear Equations in Two Variables

CollegeBoard Question Bank

Abstract

This exercise sheet contains

- an **Easy** category with 16 questions;
- a **Medium** category with 8 questions;
- a **Hard** category with 10 questions

for you to attempt. A digital copy of this sheet is available for you on [moodle](#). Feel free to utilize [the Question Space on Teams](#) to ask for guidance.

Best,
Omar :)

Linear Equations in Two Variables

Easy

(1) **b23bba4c** MULTIPLE CHOICE One answer only

$$3a + 4b = 25$$

A shipping company charged a customer \$25 to ship some small boxes and some large boxes. The equation above represents the relationship between a , the number of small boxes, and b , the number of large boxes, the customer had shipped. If the customer had 3 small boxes shipped, how many large boxes were shipped?

- a. 5
- b. 4
- c. 6
- d. 3

(2) **87322577**

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| MULTIPLE CHOICE |
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| One answer only |
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$$x + y = 75$$

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 total number of minutes spent running and biking each day
- b. The number of minutes spent running each day
- c. The number of minutes spent biking for each minute spent running
- d. The number of minutes spent biking each day

(3) **c6b151d4** MULTIPLE CHOICE One answer only

A total of 364 paper straws of equal length were used to construct two types of polygons: triangles and rectangles. The triangles and rectangles were constructed so that no two polygons had a common side. The equation $3x + 4y = 364$ represents this situation, where x is the number of triangles constructed and y is the number of rectangles constructed. What is the best interpretation of $(x, y) = (24, 73)$ in this context?

- a. If 73 triangles were constructed, then 24 rectangles were constructed.
- b. If 24 triangles were constructed, then 73 rectangles were constructed.
- c. If 24 triangles were constructed, then 73 paper straws were used.
- d. If 73 triangles were constructed, then 24 paper straws were used.

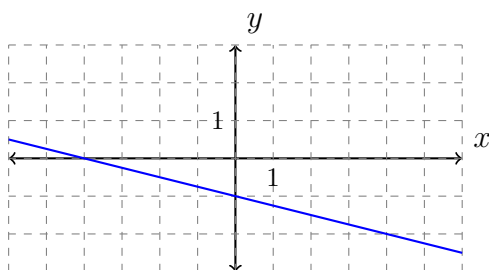
(4) **8c98c834** MULTIPLE CHOICE One answer only

The equation $y = 0.1x$ models the relationship between the number of different pieces of music a certain pianist practices, y , during an x -minute practice session. How many pieces did the pianist practice if the session lasted 30 minutes?

- a. 10
- b. 30
- c. 1
- d. 3

(5) **b2845d88** MULTIPLE CHOICE One answer only

Which of the following is an equation of the graph shown in the xy -plane below?



- a. $y = -x - \frac{1}{4}$
- b. $y = -\frac{1}{4}x - 1$
- c. $y = -x - 4$
- d. $y = -4x - 1$

(6) **8adf1335** MULTIPLE CHOICE One answer only

A city's total expense budget for one year was x million dollars. The city budgeted y million dollars for departmental expenses and 201 million dollars for all other expenses. Which of the following represents the relationship between x and y in this context?

- a. $y - x = 201$
- b. $2x - y = 201$
- c. $x + y = 201$
- d. $x - y = 201$

(7) **dd797fe2**

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| MULTIPLE CHOICE |
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| One answer only |
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$$4x + 3y = 24$$

Mario purchased 4 binders that cost x dollars each and 3 notebooks that cost y dollars each. If the given equation represents this situation, which of the following is the best interpretation of 24 in this context?

- a. The difference in the total cost, in dollars, between the number of binders and notebooks purchased
- b. The total cost, in dollars, for all binders and notebooks purchased
- c. The total cost, in dollars, for all notebooks purchased
- d. The total cost, in dollars, for all binders purchased

(8) **789975b7** MULTIPLE CHOICE One answer only

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. $0.6x + 0.4y = 240$
- b. $40x + 60y = 240$
- c. $0.4x + 0.6y = 240$
- d. $60x + 40y = 240$

(9) **2554b413** MULTIPLE CHOICE One answer only

In the xy -plane, a line has a slope of 6 and passes through the point $(0, 8)$. Which of the following is an equation of this line?

- a. $y = 8x + 48$
- b. $y = 8x + 6$
- c. $y = 6x + 8$
- d. $y = 6x + 48$

- (10) **dfa45424** MULTIPLE CHOICE One answer only

Tony spends \$80 per month on public transportation. A 10-ride pass costs \$12.50, and a single-ride pass costs \$1.50. If g represents the number of 10-ride passes Tony buys in a month and t represents the number of single-ride passes Tony buys in a month, which of the following equations best represents the relationship between g and t ?

- a. $g + t = 80$
- b. $12.50g + 1.50t = 80$
- c. $1.50g + 12.50t = 80$
- d. $g + t = 1.50 + 12.50$

(11) 520e6f5b MULTIPLE CHOICE One answer only

| Characteristics for Rock Types | | |
|--------------------------------|---------------------------------|----------------|
| Rock Type | Weight per volume (lb/ft^3) | Cost per pound |
| Basalt | 180 | \$0.18 |
| Granite | 165 | \$0.09 |
| Limestone | 120 | \$0.03 |
| Sandstone | 135 | \$0.22 |

A city is planning to build a rock retaining wall, a monument, and a garden in a park. The table above shows four rock types that will be considered for use in the project. Also shown for each rock type is its weight per volume, in pounds per cubic foot (lb/ft^3), and the cost per pound, in dollars. The equation

$$0.03(120w) + 0.08(180z) + 3385.80 = 7576.20$$

gives the total cost, in dollars, of the rocks used in the project in terms of the number of ft of limestone, w , and the number of ft of basalt, z . All four rock types are used in the project. Which of the following is the best interpretation of 3,385.80 in this context?

- a. The cost of the granite and sandstone needed for the project
- b. The cost of the basalt needed for the project
- c. The cost of the basalt and limestone needed for the project
- d. The cost of the sandstone needed for the project

(12) b2de69bd

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| MULTIPLE CHOICE |
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| One answer only |
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| x | y |
|-----|-----|
| 1 | 5 |
| 2 | 7 |
| 3 | 9 |
| 4 | 11 |

The table above shows some pairs of x values and y values. Which of the following equations could represent the relationship between x and y ?

- a. $y = 3x - 2$
- b. $y = 2x + 3$
- c. $y = 4x - 1$
- d. $y = 5x$

(13) 1efd8202

MULTIPLE CHOICE

One answer only

$$y = 70x + 8$$

Which table gives three values of x and their corresponding values of y for the given equation?

a.

| x | y |
|-----|-----|
| 0 | 8 |
| 2 | 132 |
| 4 | 272 |

b.

| x | y |
|-----|-----|
| 0 | 8 |
| 2 | 148 |
| 4 | 288 |

c.

| x | y |
|-----|-----|
| 0 | 70 |
| 2 | 78 |
| 4 | 86 |

d.

| x | y |
|-----|-----|
| 0 | 70 |
| 2 | 140 |
| 4 | 280 |

(14) **b9839f9e**

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| MULTIPLE CHOICE |
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| One answer only |
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$$F = 2.50x + 7.00y$$

In the equation above, F represents the total amount of money, in dollars, a food truck charges for x drinks and y salads. The price, in dollars, of each drink is the same, and the price, in dollars, of each salad is the same. Which of the following is the best interpretation for the number 7.00 in this context?

- a. The price, in dollars, of one salad
- b. The number of drinks bought during the day
- c. The number of salads bought during the day
- d. The price, in dollars, of one drink

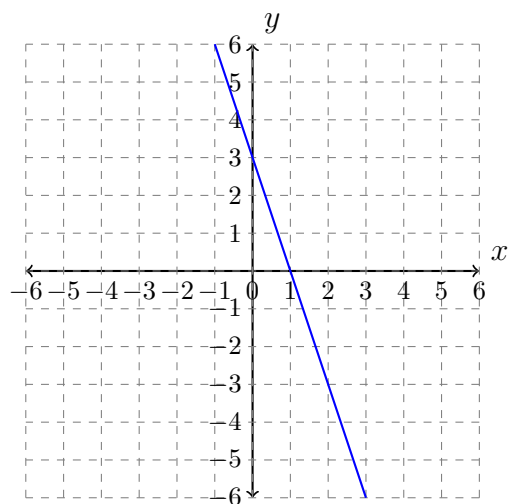
(15) **8b2a2a63** SHORT ANSWER Case-Insensitive

The y -intercept of the graph of in the xy -plane is $(0, y)$. What is the value of y ?

(16) 8a1544f1

MULTIPLE CHOICE

One answer only



What is the equation of the line shown in the xy -plane above?

- a. $y = 3x - 3$
- b. $y = -\frac{1}{3}x + 3$
- c. $y = -3x + 3$
- d. $y = \frac{1}{3}x - 3$

Medium

(1) 002dba45 SHORT ANSWER Case-Insensitive

Line k is defined by $y = -\frac{17}{3}x + 5$. Line j is perpendicular to line k in the xy -plane. What is the slope of line j ?

(2) **9c7741c6** SHORT ANSWER Case-Insensitive

On a 210-mile trip, Cameron drove at an average speed of 60 miles per hour for the first x hours. He then completed the trip, driving at an average speed of 50 miles per hour for the remaining y hours. If $x = 1$, what is the value of y ?

(3) **d62ad380** MULTIPLE CHOICE One answer only

An artist paints and sells square tiles. The selling price P , in dollars, of a painted tile is a linear function of the side length of the tile s , in inches, as shown in the table below.

| Side length, s (inches) | Price, P (dollars) |
|---------------------------|----------------------|
| 3 | 8.00 |
| 6 | 18.00 |
| 9 | 28.00 |

Which of the following could define the relationship between s and P ?

- a. $P = \frac{10}{3}s + 8$
- b. $P = 3s + 10$
- c. $P = \frac{3}{10}s - \frac{1}{10}$
- d. $P = \frac{10}{3}s - 2$

- (4) **431c3038**

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| MULTIPLE CHOICE |
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| One answer only |
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In an article about exercise, it is estimated that a 160-pound adult uses 200 calories for every 30 minutes of hiking and 150 calories for every 30 minutes of bicycling. An adult who weighs 160 pounds has completed 1 hour of bicycling. Based on the article, how many hours should the adult hike to use a total of 1,900 calories from bicycling and hiking?

- a. 4
- b. 8.75
- c. 6
- d. 9.5

(5) **28c2253f**

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| MULTIPLE CHOICE |
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| One answer only |
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| Characteristics for Rock Types | | |
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A city is planning to build a rock retaining wall, a monument, and a garden in a park. The table above shows four rock types that will be considered for use in the project. Also shown for each rock type is its weight per volume, in pounds per cubic foot (lb/ft^3), and the cost per pound, in dollars. Only basalt, granite, and limestone will be used in the garden. The rocks in the garden will have a total weight of 1,000 pounds. If 330 pounds of granite is used, which of the following equations could show the relationship between the amounts, x and y , in ft , for each of the other rock types used?

- a. $120x + 180y = 1000$
- b. $165x + 180y = 670$
- c. $120x + 180y = 670$
- d. $165x + 120y = 1000$

- (6) **2e1a7f66** MULTIPLE CHOICE One answer only

Figure A and figure B are both regular polygons. The sum of the perimeter of figure A and the perimeter of figure B is 63 inches. The equation $3x + 6y = 63$ represents this situation, where x is the number of sides of figure A and y is the number of sides of figure B . Which statement is the best interpretation of 6 in this context?

- a. The number of sides of figure B is 6.
- b. Each side of figure A has a length of 6 inches.
- c. Each side of figure B has a length of 6 inches.
- d. The number of sides of figure A is 6.

(7) **9ed4c1a2** SHORT ANSWER Case-Insensitive

What is the slope of the graph of $y = \frac{1}{4}(27x + 15) + 7x$ in the xy-plane?

(8) **fb43b85f** SHORT ANSWER Case-Insensitive

A line passes through the points $(4, 6)$ and $(15, 24)$ in the xy -plane.
What is the slope of the line?

Hard

- (1) **3cdbf026** MULTIPLE CHOICE One answer only

The graph of the equation $ax + ky = 6$ is a line in the xy -plane, where a and k are constants. If the line contains the points $(-2, -6)$ and $(0, -3)$, what is the value of k ?

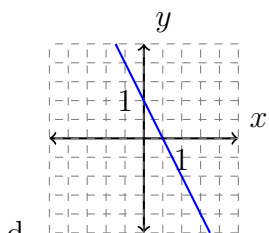
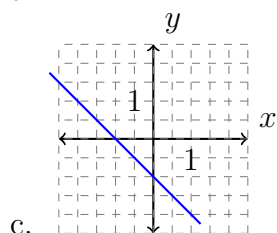
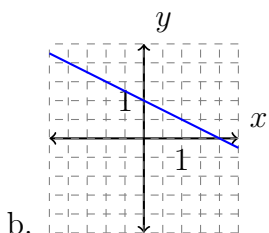
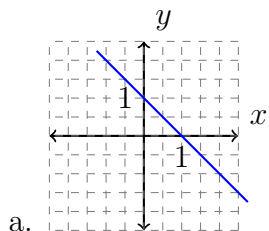
- a. -1
- b. 2
- c. 3
- d. -2

(2) **free0fbf** SHORT ANSWER Case-Insensitive

In the xy -plane, line k intersects the y -axis at the point $(0, -6)$ and passes through the point $(2, 2)$. If the point $(20, w)$ lies on line k , what is the value of w ?

(3) **0b46bad5** MULTIPLE CHOICE One answer only

$ax + by = b$ In the equation above, a and b are constants and $0 < a < b$. Which of the following could represent the graph of the equation in the xy -plane?

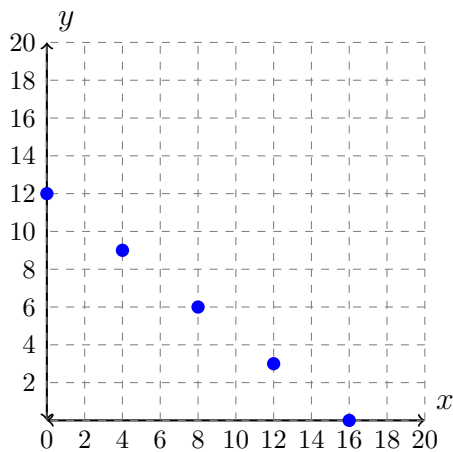


(4) **c362c210**

SHORT ANSWER

Case-Insensitive

Number of Cornflowers and Wallflowers at Garden Store



The points plotted in the coordinate plane above represent the possible numbers of wallflowers and cornflowers that someone can buy at the Garden Store in order to spend exactly \$24.00 total on the two types of flowers. The price of each wallflower is the same and the price of each cornflower is the same. What is the price, in dollars, of 1 cornflower?

(5) **98d3393a** MULTIPLE CHOICE One answer only

Line l in the xy -plane is perpendicular to the line with equation $x = 2$.
What is the slope of line l ?

- a. -2
- b. $-\frac{1}{2}$
- c. 0
- d. The slope of line l is undefined

(6) 0366d965

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|--------------|
| SHORT ANSWER |
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| |
|------------------|
| Case-Insensitive |
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| x | y |
|-----|-----|
| 3 | 7 |
| k | 11 |
| 12 | n |

The table above shows the coordinates of three points on a line in the xy -plane, where k and n are constants. If the slope of the line is 2, what is the value of $k + n$?

- (7) **c4ea43ef** MULTIPLE CHOICE One answer only

To earn money for college, Avery works two part-time jobs: A and B . She earns \$10 per hour working at job A and \$20 per hour working at job B . In one week, Avery earned a total of s dollars for working at the two part-time jobs. The graph above represents all possible combinations of numbers of hours Avery could have worked at the two jobs to earn s dollars. What is the value of s ?

- a. 320
- b. 200
- c. 160
- d. 128

(8) **cb58833c** SHORT ANSWER Case-Insensitive

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?

(9) **a7a14e87** MULTIPLE CHOICE One answer only

In the xy -plane, line k is defined by $x + y = 0$. Line j is perpendicular to line k , and the y -intercept of line j is $(0, 3)$. Which of the following is an equation of line j ?

- a. $x + y = 3$
- b. $x + y = -3$
- c. $x - y = 3$
- d. $x - y = -3$

(10) **a1fd2304** SHORT ANSWER Case-Insensitive

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?

Total of marks: 34