Systems of Two Linear Equations in Two Variables

CollegeBoard Question Bank

Abstract

This exercise sheet contains

- an **Easy** category with 13 questions;
- a **Medium** category with 9 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 :)

Systems of Two Linear Equations in Two Variables

Easy

(1) **b86123af** MULTIPLE CHOICE One answer only

Hiro and Sofia purchased shirts and pants from a store. The price of each shirt purchased was the same and the price of each pair of pants purchased was the same. Hiro purchased 4 shirts and 2 pairs of pants for \$86, and Sofia purchased 3 shirts and 5 pairs of pants for \$166. Which of the following systems of linear equations represents the situation, if x represents the price, in dollars, of each shirt and y represents the price, in dollars, of each pair of pants?

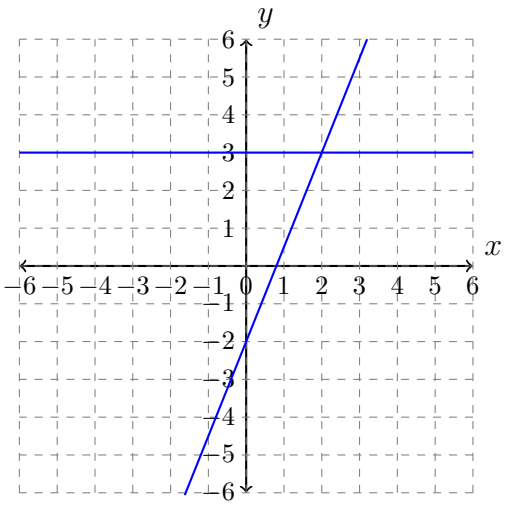
a. $\begin{matrix} 4x+2y=166 \\ 3x+5y=86 \end{matrix}$

b. $\begin{matrix} 4x+3y=86 \\ 2x+5y=166 \end{matrix}$

c. $\begin{matrix} 4x+3y=166 \\ 2x+5y=86 \end{matrix}$

d. $\begin{matrix} 4x+2y=86 \\ 3x+5y=166 \end{matrix}$

(2) **b0fc3166** MULTIPLE CHOICE One answer only



The graph of a system of linear equations is shown. What is the solution (x, y) to the system?

a. $(2, 3)$
b. $(0, 3)$
c. $(3, 3)$
d. $(1, 3)$

(3) **dba8d38a** MULTIPLE CHOICE One answer only

A petting zoo sells two types of tickets. The standard ticket, for admission only, costs \$5. The premium ticket, which includes admission and food to give to the animals, costs \$12. One Saturday, the petting zoo sold a total of 250 tickets and collected a total of $\$2,300$ from ticket sales. Which of the following systems of equations can be used to find the number of standard tickets, s, and premium tickets, p, sold on that Saturday?

a. $\begin{matrix} 5s+12p=250 \\ s+p=2{,}300 \end{matrix}$

b. $\begin{matrix} s+p=250 \\ 5s+12p=2{,}300 \end{matrix}$

c. $\begin{matrix} s+p=250 \\ 12s+5p=2{,}300 \end{matrix}$

d. $\begin{matrix} 12s+5p=250 \\ s+p=2{,}300 \end{matrix}$

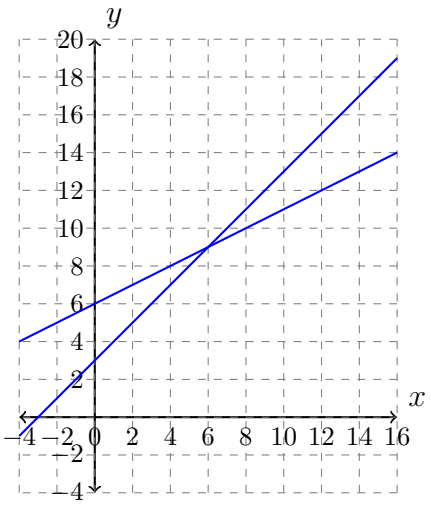
(4) **8abed0fb** MULTIPLE CHOICE One answer only

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

$$y = 2x + 3$$
$$x = 1$$

a. $(2, 3)$
b. $(2, 7)$
c. $(1, 2)$
d. $(1, 5)$

(5) **e1259a5a** MULTIPLE CHOICE One answer only



Which of the following points is the solution to the system of equations?

a. $(8, 10)$
b. $(3, 9)$
c. $(6, 15)$
d. $(12, 18)$

(6) **ee031767** MULTIPLE CHOICE One answer only

A dance teacher ordered outfits for students for a dance recital. Outfits for boys cost \$26, and outfits for girls cost \$35. The dance teacher ordered a total of 28 outfits and spent \$881. If b represents the number of outfits the dance teacher ordered for boys and g represents the number of outfits the dance teacher ordered for girls, which of the following systems of equations can be solved to find b and g?

a. $\begin{matrix} 26g+35b=881 \\ b+g=28 \end{matrix}$

b. $\begin{matrix} 26g+35b=28 \\ b+g=881 \end{matrix}$

c. $\begin{matrix} 26b+35g=28 \\ b+g=881 \end{matrix}$

d. $\begin{matrix} 26b+35g=881 \\ b+g=28 \end{matrix}$

(7) **cd33b015** MULTIPLE CHOICE One answer only

$$x + y = 20$$
$$2(x + y) + 3y = 85$$

If (x, y) is the solution to the given system of equations, what is the value of y?

a. 65
b. 60
c. 15
d. 10

(8) **0d1dca87** SHORT ANSWER Case-Insensitive

$$3x + y = 29$$
$$x = 2$$

If (x, y) is the solution to the given system of equations, what is the value of y?

(9) **0df106df** MULTIPLE CHOICE One answer only

An online bookstore sells novels and magazines. Each novel sells for \$4, and each magazine sells for \$1. If Sadie purchased a total of 11 novels and magazines that have a combined selling price of \$20, how many novels did she purchase?

a. 3
b. 4
c. 2
d. 5

(10) **7d89376f** MULTIPLE CHOICE One answer only

A discount airline sells a certain number of tickets, x, for a flight for \$90 each. It sells the number of remaining tickets, y, for \$250 each. For a particular flight, the airline sold 120 tickets and collected a total of $\$27,600$ from the sale of those tickets. Which system of equations represents this relationship between x and y?

a. $\begin{array}{c} 90x=250y \\ 120x+120y=27600 \end{array}$

b. $\begin{array}{c} x+y=27600 \\ 90x+250y=120(27{,}600) \end{array}$

c. $\begin{array}{c} x+y=120 \\ 90x+250y=27{,}600 \end{array}$

d. $\begin{array}{c} x+y=120 \\ 90x+250y=120(27{,}600) \end{array}$

(11) **17f176ec** MULTIPLE CHOICE One answer only

A movie theater charges \$11 for each full-price ticket and \$8.25 for each reduced-price ticket. For one movie showing, the theater sold a total of 214 full-price and reduced-price tickets for $\$2,145$. Which of the following systems of equations could be used to determine the number of full-price tickets, f, and the number of reduced-price tickets, r, sold?

a. $\begin{matrix} f+r=2{,}145 \\ 11f+8.25r=214 \end{matrix}$

b. $\begin{matrix} f+r=2{,}145 \\ 8.25f+11r=214 \end{matrix}$

c. $\begin{matrix} f+r=214 \\ 8.25f+11r=2{,}145 \end{matrix}$

d. $\begin{matrix} f+r=214 \\ 11f+8.25r=2{,}145 \end{matrix}$

(12) **44d65912** MULTIPLE CHOICE One answer only

Angela is playing a video game. In this game, players can score points only by collecting coins and stars. Each coin is worth c points, and each star is worth s points.

- The first time she played, Angela scored 700 points. She collected 20 coins and 10 stars.
- The second time she played, Angela scored 850 points. She collected 25 coins and 12 stars.

Which system of equations can be used to correctly determine the values of c and s?

a. $\begin{matrix} 10c+20s=700 \\ 12c+25s=850 \end{matrix}$

b. $\begin{matrix} 20c+700s \\ 25c+850s=12 \end{matrix}$

c. $\begin{matrix} 20c+10s=700 \\ 25c+12s=850 \end{matrix}$

d. $\begin{matrix} 700c+20s=10 \\ 850c+25s=12 \end{matrix}$

(13) **4b76c7f1** MULTIPLE CHOICE One answer only

$$2x + 7y = 9$$
$$8x + 28y = a$$

In the given system of equations, a is a constant. If the system has infinitely many solutions, what is the value of a?

a. 9
b. 4
c. 36
d. 54

Medium

(1) **cb8f449f** MULTIPLE CHOICE One answer only

$\frac{1}{2}y = 4$
$x - \frac{1}{2}y = 2$

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

a. 6
b. 3
c. $\frac{7}{2}$
d. 4

(2) **71189542** MULTIPLE CHOICE One answer only

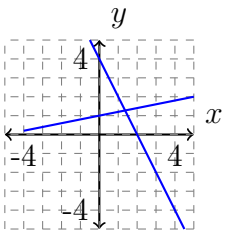
A group of 202 people went on an overnight camping trip, taking 60 tents with them. Some of the tents held 2 people each, and the rest held 4 people each. Assuming all the tents were filled to capacity and every person got to sleep in a tent, exactly how many of the tents were 2−person tents?

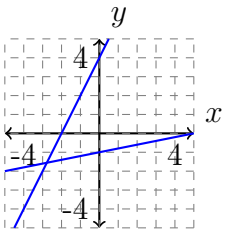
a. 20
b. 19
c. 18
d. 30

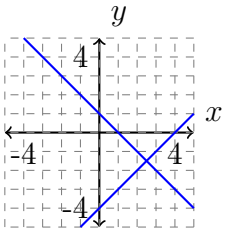
(3) **6e6a3241** MULTIPLE CHOICE One answer only

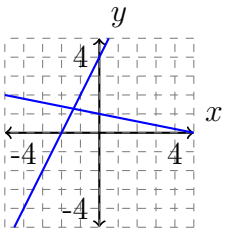
$$x + 5y = 5$$
$$2x - y = -4$$

Which of the following graphs in the $xy-$plane could be used to solve the system of equations above?

a.


b.


c.


d.


(4) **ed92fb68** MULTIPLE CHOICE One answer only

$$4x + 5y = 100$$
$$5x + 4y = 62$$

If the system of equations above has solution (x, y), what is the value of $x + y$?

a. 9
b. 0
c. 38
d. 18

(5) **19fdf387** MULTIPLE CHOICE One answer only

In the $xy-$plane, the graph of $y = x + 3$ intersects the graph of $y = 2x - 6$ at the point (a, b). What is the value of a?

a. 12
b. 6
c. 9
d. 3

(6) **c5082ce3** SHORT ANSWER Case-Insensitive

The score on a trivia game is obtained by subtracting the number of incorrect answers from twice the number of correct answers. If a player answered 40 questions and obtained a score of 50, how many questions did the player answer correctly?

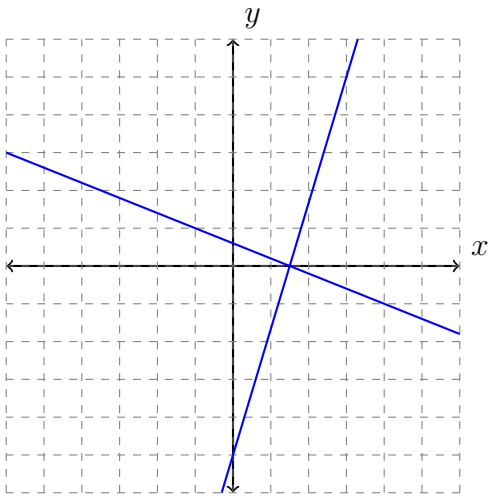
(7) **5e422ff9** MULTIPLE CHOICE One answer only

$$y = 2x - 3$$
$$3y = 5x$$

In the solution to the system of equations above, what is the value of y?

a. 15
b. -15
c. 9
d. -9

(8) **2704399f** MULTIPLE CHOICE One answer only



Which of the following systems of equations has the same solution as the system of equations graphed above?

a. $\begin{matrix} y=\frac{3}{2} \\ x=0 \end{matrix}$

b. $\begin{matrix} y=0 \\ x=1 \end{matrix}$

c. $\begin{matrix} y=0 \\ x=\frac{3}{2} \end{matrix}$

d. $\begin{matrix} y=1 \\ x=0 \end{matrix}$

(9) **b544a348** SHORT ANSWER Case-Insensitive

$$5x + 3y = 38$$
$$x + 3y = 10$$

In the solution (x, y) to the system of equations above, what is the value of x?

Hard

(1) **d1b66ae6** SHORT ANSWER Case-Insensitive

$$-x + y = -3.5$$
$$x + 3y = 9.5$$

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

(2) **70feb725** MULTIPLE CHOICE One answer only

During a month, Morgan ran r miles at 5 miles per hour and biked b miles at 10 miles per hour. She ran and biked a total of 200 miles that month, and she biked for twice as many hours as she ran. What is the total number of miles that Morgan biked during the month?

a. 100
b. 120
c. 160
d. 80

(3) **e1248a5c** MULTIPLE CHOICE One answer only

$$\frac{1}{2}x + \frac{1}{3}y = \frac{1}{6}$$
$$ax + y = c$$

In the system of equations below, a and c are constants. If the system of equations has an infinite number of solutions , what is the value of a?

a. $-\frac{1}{2}$
b. $\frac{1}{2}$
c. 0
d. $\frac{3}{2}$

(4) **52cb8ea4** MULTIPLE CHOICE One answer only

$$7x - 5y = 4$$
$$4x - 8y = 9$$

If (x, y) is the solution to the system of equations above, what is the value of $3x + 3y$?

a. 5
b. -5
c. -13
d. 13

(5) **d7bf55e1** SHORT ANSWER Case-Insensitive

A movie theater sells two types of tickets, adult tickets for \$12 and child tickets for \$8. If the theater sold 30 tickets for a total of \$300, how much, in dollars, was spent on adult tickets? (Disregard the \$ sign when gridding your answer.)

(6) **f718c9cf** SHORT ANSWER Case-Insensitive

$$5x + 14y = 45$$
$$10x + 7y = 27$$

The solution to the given system of equations is (x, y). What is the value of xy?

(7) **466b87e3** SHORT ANSWER Case-Insensitive

$$y = \frac{1}{2}x + 8$$
$$y = cx + 10$$

In the system of equations above, c is a constant. If the system has no solution, what is the value of c?

(8) **e2e3942f** MULTIPLE CHOICE One answer only

$$y = 2x + 1$$
$$y = ax - 8$$

In the system of equations above, a is a constant. If the system of equations has no solution, what is the value of a?

a. 2
b. 1
c. 0
d. $-\frac{1}{2}$

(9) **1e11190a** MULTIPLE CHOICE One answer only

Store A sells raspberries for \$5.50 per pint and blackberries for \$3.00 per pint. Store B sells raspberries for \$6.50 per pint and blackberries for \$8.50 per pint. A certain purchase of raspberries and blackberries would cost \$37.00 at Store A or \$66.00 at Store B. How many pints of blackberries are in this purchase?

a. 4
b. 5
c. 8
d. 12

(10) **567ac7ab** MULTIPLE CHOICE One answer only

One of the two equations in a linear system is $2x+6y = 10$. The system has no solution. Which of the following could be the other equation in the system?

a. $x + 3y = -20$
b. $6x - 2y = 0$
c. $6x + 2y = 10$
d. $x + 3y = 5$

Total of marks: 32