



Missouri

End-of-Course Assessment

Algebra I

Session I



Missouri Department of Elementary and Secondary Education
Released 2008



RIVERSIDE PUBLISHING

a subsidiary of Houghton Mifflin Harcourt

No part of this work may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording or by an information storage or retrieval system without the prior written permission of The Riverside Publishing Company unless such copying is expressly permitted by federal copyright law. Address inquiries to Permissions Department, Riverside Publishing, 3800 Golf Rd., Suite 100, Rolling Meadows, IL 60008-4015.

Directions to the Student

Today you will be taking Session I of the Missouri Algebra I Test. This is a test of how well you understand the course level expectations for Algebra I.

There are several important things to remember:

- 1** Read each question carefully and think about the answer. Then choose the one answer that you think is best.
- 2** Make sure you completely fill in the bubble for the answer on your answer sheet with a number 2 pencil.
- 3** If you do not know the answer to a question, skip it and go on. You may return to it later if you have time.
- 4** If you finish the test early, you may check over your work.
- 5** Do NOT write in your test booklet. Mark your answers directly on your answer sheet with a number 2 pencil.

1. If the first Now = -9 , which equation represents this sequence?

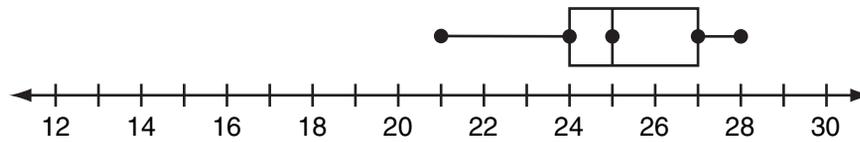
$-9, -4, 1, 6, 11, \dots$

- A. Next = Now $- 5$
- B. Next = Now $+ 5$
- C. Next = $5 \cdot$ Now $- 1$
- D. Next = $5 \cdot$ Now $+ 1$

2. Which inequality statement is *true*?

- A. $8 < \sqrt{78} < 9$
- B. $38 < \sqrt{78} < 40$
- C. $77 < \sqrt{78} < 79$
- D. $6,083 < \sqrt{78} < 6,085$

3. Daniel made a box-and-whisker plot of the ages of his cousins.



What is the median age of his cousins?

- A. 24
 - B. 25
 - C. 27
 - D. 28
4. Given $y = x^2$, how would the graph of $y = x^2 - 2$ differ?
- A. It shifts 2 units up.
 - B. It shifts 2 units down.
 - C. It shifts 2 units left.
 - D. It shifts 2 units right.

5. Given the following fractions:

$$\frac{3}{4}, \frac{18}{29}, \frac{24}{39}, \frac{3}{5}, \frac{12}{18}$$

Which group below has the fractions in order from *least to greatest*?

- A. $\frac{3}{5}, \frac{24}{39}, \frac{18}{29}, \frac{12}{18}, \frac{3}{4}$
- B. $\frac{3}{4}, \frac{3}{5}, \frac{18}{29}, \frac{24}{39}, \frac{12}{18}$
- C. $\frac{3}{5}, \frac{12}{18}, \frac{24}{39}, \frac{3}{4}, \frac{18}{29}$
- D. $\frac{3}{4}, \frac{3}{5}, \frac{12}{18}, \frac{18}{29}, \frac{24}{39}$

6. The automobile repair shop uses the following chart to determine labor costs for each job.

**Automobile
Repair Shop Costs**

Hours	Labor Cost
1	\$25
2	\$40
3	\$55
4	\$70

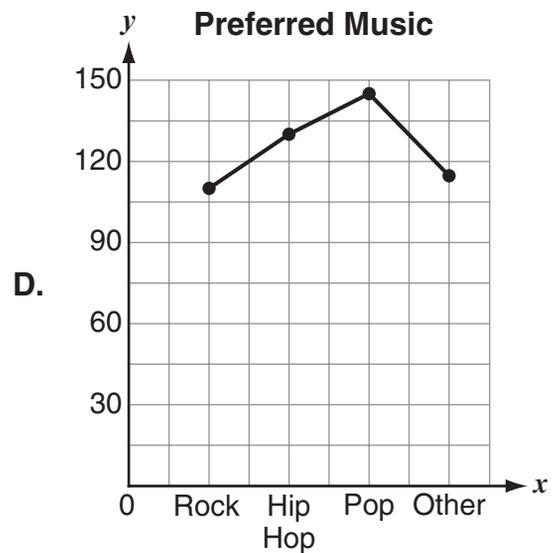
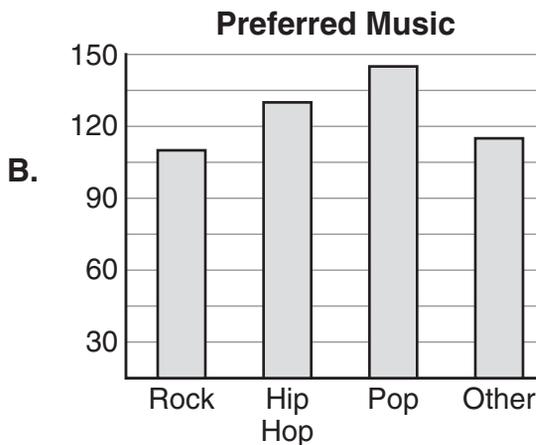
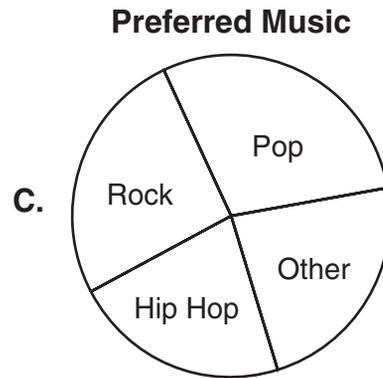
Which function should the automobile repair shop use to determine the labor cost, C , for a job that takes h hours?

- A. $C = 15h$
- B. $C = 15h + 10$
- C. $C = 25 + 15h$
- D. $C = 25h + 15h$

7. A survey was administered to 500 high school students to determine the type of music they prefer. The survey indicated that 22% prefer rock, 26% prefer hip hop, 29% prefer pop, and 23% selected “other.” Which representation best illustrates the *number* of students preferring each type of music?

A.

Preferred Music	
Type	Percent of Students
Rock	22
Hip Hop	26
Pop	29
Other	23



8. What is the value of the numerical expression below?

$$\sqrt{16} + \frac{24}{3} - 2^3$$

- A. 4
- B. 6
- C. 8
- D. 10

9. Aaron listed the ages of all of his family members as shown below.

10, 10, 10, 10, 10, 12, 14, 14, 15, 16, 50, 50, 51, 53, 80

What is the mean age of his family members?

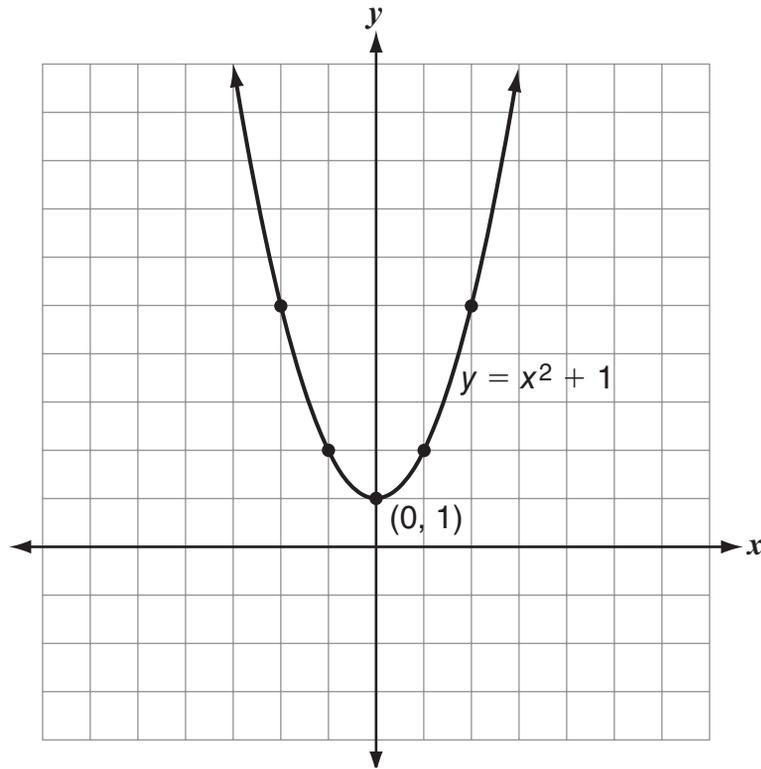
- A. 10
- B. 14
- C. 27
- D. 70

10. What is the product of the following expression?

$$2x(x^2 + x - 5)$$

- A. $2x^3 + x - 5$
- B. $2x^3 + 2x - 10$
- C. $2x^3 + 2x^2 - 5x$
- D. $2x^3 + 2x^2 - 10x$

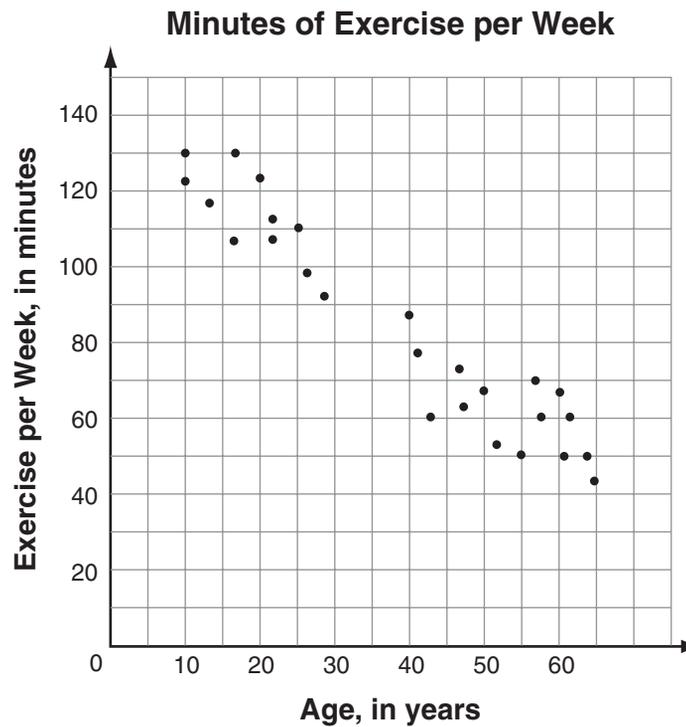
11. Beth and Jacob are graphing two equations on a coordinate grid. Beth has graphed the equation $y = x^2 + 1$.



If Jacob graphs $y = x^2 + 3$, where will his graph be in relation to the graph Beth made?

- A. 2 units up
- B. 3 units up
- C. 2 units to the left
- D. 3 units to the right

12. A survey was taken asking participants their age and the number of minutes they exercise per week. The results of the survey are shown in the scatterplot below.



The data for people who are 30 to 39 years of age are not displayed. Based on the scatterplot, how many minutes would a 30- to 39-year-old person be expected to exercise?

- A. 40–60 minutes
- B. 60–80 minutes
- C. 80–100 minutes
- D. 100–120 minutes

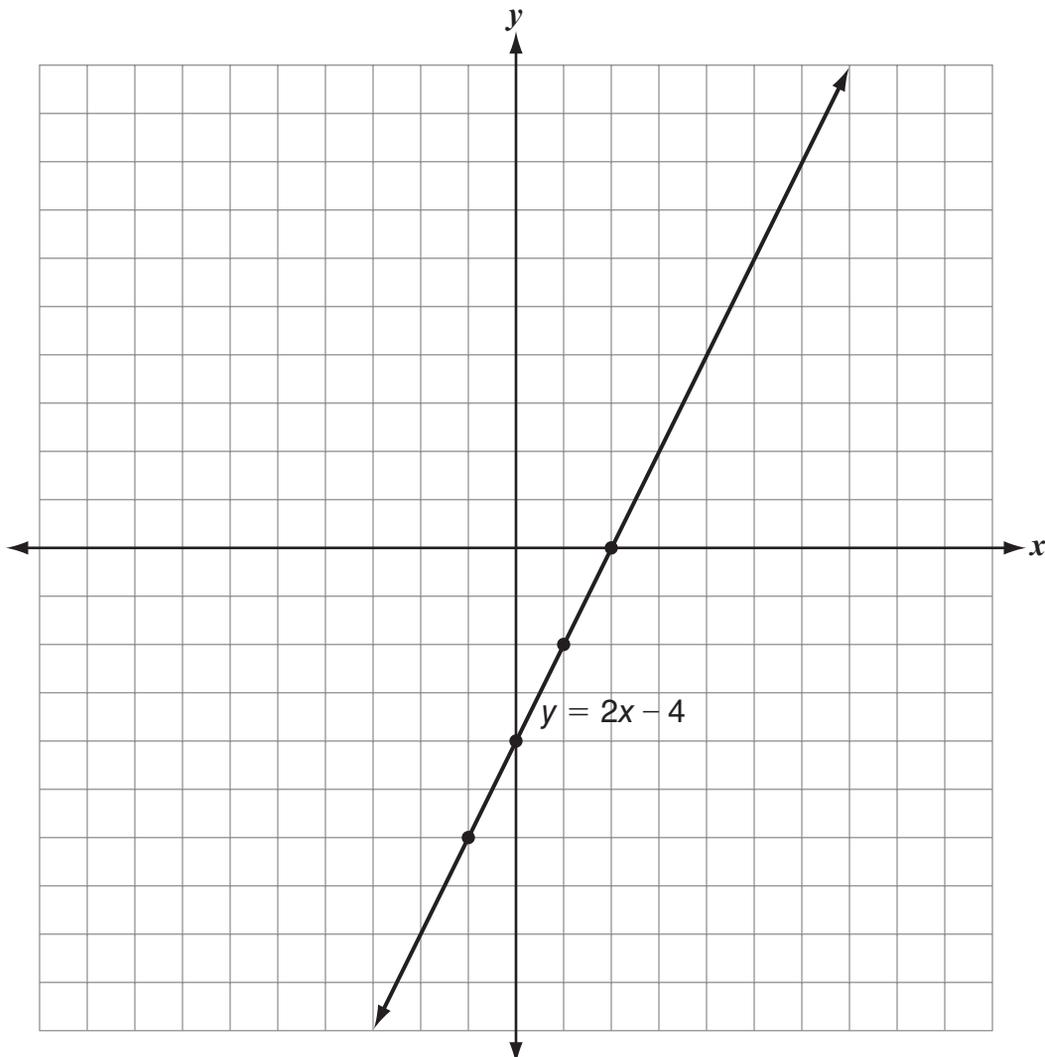
13. Ben bought 8 notebooks for \$24.50. Some of the notebooks were \$2.50 each, and the others were \$3.25 each. If x represents the number of least expensive notebooks, which equation can be used to find the number of least expensive notebooks purchased?

- A. $\$5.75(8 - x) = \24.50
- B. $\$2.50(x - 8) + \$3.25x = \$24.50$
- C. $\$2.50x + \$3.25(8 - x) = \$24.50$
- D. $\$2.50x + \$3.25(x - 8) = \$24.50$

14. The number 18 is 24% of which number?

- A. 4.32
- B. 75
- C. $133\frac{1}{3}$
- D. 432

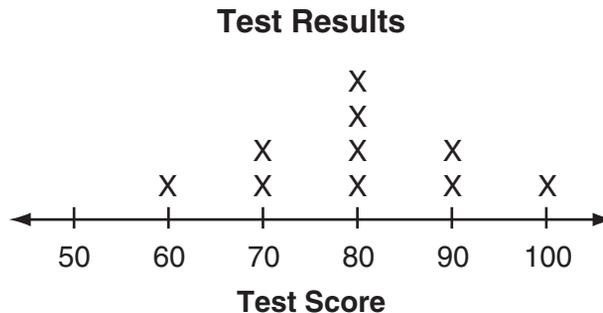
15. The graph of $y = 2x - 4$ is shown below.



If the slope of the line is doubled, the new equation is $y = 4x - 4$. Which of these is a correct comparison of the two lines?

- A. The x-intercept and y-intercept change.
- B. The x-intercept and y-intercept stay the same.
- C. The x-intercept changes, and the y-intercept is the same.
- D. The x-intercept is the same, and the y-intercept changes.

16. The following line graph shows the test scores for 10 students on a unit exam.



Which shape *most accurately* describes these data?

- A. The data are skewed to the left.
 - B. The data are skewed to the right.
 - C. a bimodal or “U”-shaped curve
 - D. a normal or “bell”-shaped curve
17.  Mary would like to plant grass in her backyard. Her backyard is a rectangle that measures 10 yd by 8 yd. In the middle of her backyard is a circular swimming pool that has a diameter of 5 yd. What is the area to be planted with grass, to the nearest tenth of a square yard?
- A. 1.5 yd²
 - B. 19.6 yd²
 - C. 60.4 yd²
 - D. 80 yd²

18. Which expression represents the output of the n th term?

Input	1	2	3	4	5	n
Output	1	3	5	7	9	

- A. $n + 2$
- B. $n + 11$
- C. $2n + 1$
- D. $2n - 1$

19. What is the solution to the equation?

$$-12 = 6 + \frac{2}{3}y$$

- A. -27
- B. -24
- C. -12
- D. -9

20. What is the mode of the data set displayed below?

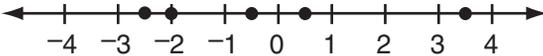
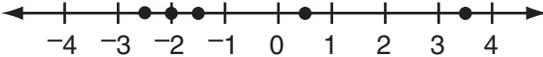
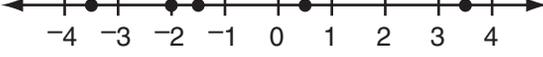
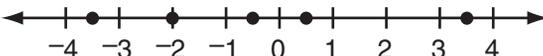
Stem	Leaf
1	0 0 3 4 4 4 4 4
2	2 2 4 9
3	1 1 2 3
4	6 7 8 8 8 8 8 9 9
5	0 0 1 2 5 7
19	8

Key
1 3 = 13

- A. 14
- B. 48
- C. 4 and 8
- D. 14 and 48

21. Which number line below shows the set of numbers graphed correctly?

$$\left\{3.5, \frac{-7}{2}, \frac{1}{2}, -2, -1\frac{1}{2}\right\}$$

- A. 
- B. 
- C. 
- D. 

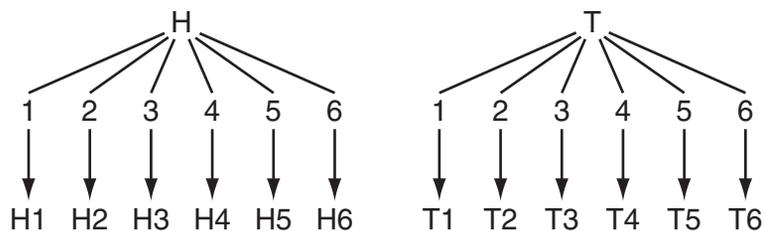
22. What is true about the slope and y -intercept of the two equations below?

$$4x + 3y = 12$$

$$-8x + 6y = 6$$

- A. same slope, same y -intercept
- B. same slope, different y -intercept
- C. different slope, same y -intercept
- D. different slope, different y -intercept

23. The diagram shows the outcomes of flipping a coin and rolling a die.



Which statement regarding the diagram is *false*?

- A. The probability of obtaining “H6” is 2 out of 12.
- B. There are 12 possible outcomes in the sample space.
- C. The chance of flipping “heads” and rolling a “5” is 1 in 12.
- D. Flipping “tails” and rolling a “2” represents about 8% of the possible outcomes of the sample space.

24. The population of a type of bacteria triples every minute. The chart below represents the population of bacteria after t minutes.

t	Bacteria Population
0	1
1	3
2	9
3	27
4	81
5	243

Which type of function represents the data?

- A. linear
 - B. quadratic
 - C. exponential
 - D. absolute value
25. What are the slope, m , and the y -intercept, b , of a line that passes through the points $(-3, 1)$ and $(7, -5)$?
- A. $m = \frac{-3}{5}$ and $b = \frac{-4}{5}$
 - B. $m = \frac{-5}{3}$ and $b = -4$
 - C. $m = \frac{-4}{5}$ and $b = \frac{-3}{5}$
 - D. $m = \frac{-3}{5}$ and $b = 4$

26. Given the following set of numbers:

$$-\sqrt{4}, -2\frac{2}{3}, -2.\bar{3}, \frac{-5}{2}, -2.7$$

Which set is in order from *least to greatest*?

A. $\left\{-2.7, -2.\bar{3}, -2\frac{2}{3}, \frac{-5}{2}, -\sqrt{4}\right\}$

B. $\left\{-2.7, -2\frac{2}{3}, \frac{-5}{2}, -2.\bar{3}, -\sqrt{4}\right\}$

C. $\left\{-\sqrt{4}, \frac{-5}{2}, -2\frac{2}{3}, -2.\bar{3}, -2.7\right\}$

D. $\left\{-\sqrt{4}, -2.\bar{3}, \frac{-5}{2}, -2\frac{2}{3}, -2.7\right\}$

27. Which of these shows the following expression factored completely?

$$6x^2 + 15x - 36$$

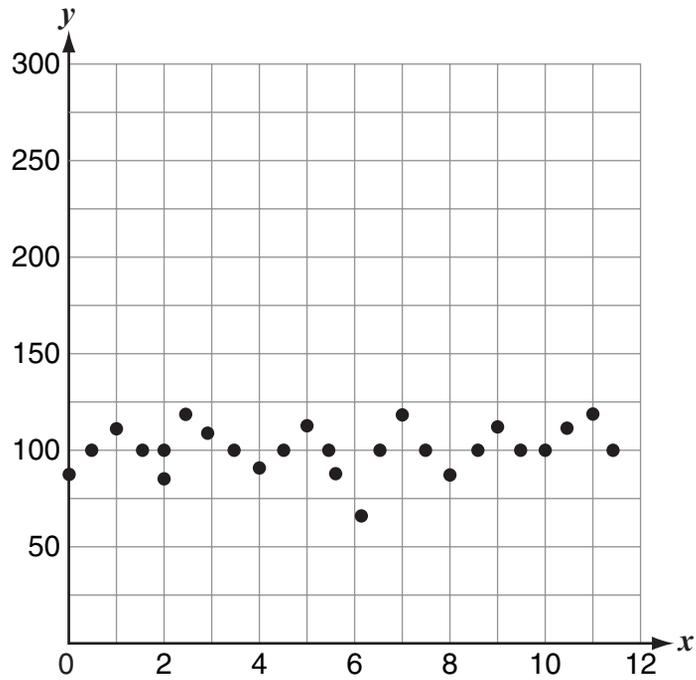
A. $(2x - 3)(x + 4)$

B. $(6x + 9)(x - 4)$

C. $3(2x - 3)(x + 4)$

D. $3(2x + 3)(x - 4)$

28. A scatterplot is shown on the graph below.



Which of these could be a line of best fit?

- A. $y = x + 100$
- B. $y = x - 100$
- C. $x = 100$
- D. $y = 100$

29. What is the equation of the function represented by this table of values?

x	-2	-1	0	1	2
y	$\frac{3}{25}$	$\frac{3}{5}$	3	15	75

- A. $y = 5x + 3$
- B. $y = 12x + 3$
- C. $y = 3 \cdot 5^x$
- D. $y = 5 \cdot 3^x$
30. The enrollment at High School R has been increasing by 20 students per year. Currently High School R has 200 students attending. High School T currently has 400 students, but its enrollment is decreasing in size by an average of 30 students per year. If the two schools continue their current enrollment trends over the next few years, how many years will it take the schools to have the same enrollment?
- A. 4 years
- B. 5 years
- C. 10 years
- D. 20 years

31. What is the solution to the following inequality?

$$\frac{1}{3}(6 - x) \geq -2$$

- A. $x \geq 0$
- B. $x \leq 0$
- C. $x \geq 12$
- D. $x \leq 12$

32. Which is a true statement about the data shown in the tables?

Table 1

x	y
1	4
2	5
3	6
9	12
10	13

Table 2

x	y
0	0
1	1
2	4
3	9
4	16

- A. Both tables represent a linear relation.
- B. Only Table 1 represents a linear relation.
- C. Only Table 2 represents a linear relation.
- D. Neither table represents a linear relation.

33. The length of a rectangle is 4 times its width. If the length of the rectangle is cut in half, the new perimeter is which percent of the original perimeter?



- A. 25%
- B. 50%
- C. 60%
- D. 100%

34. What is the simplified form of the expression?

$$\frac{4x^3y^3}{8x^5y^2}$$

- A. $\frac{y}{2x^2}$
- B. $\frac{2y}{x^2}$
- C. $2x^2y$
- D. $2x^8y^5$

35. What is the solution for the system of equations?

$$\begin{aligned}y &= 2x - 3 \\4x - 3y &= 31\end{aligned}$$

- A. $(-11, -25)$
- B. $(-11, -19)$
- C. $(11, 19)$
- D. $(14, 25)$

Released Form