4-3 Solve Quadratic Equations by Factoring

KeyConcept Zero Product Property

Words	For any real numbers a and b, if $ab = 0$, then either $a = 0$, $b = 0$, or both a and b equal zero.
Example	If $(x + 3)(x - 5) = 0$, then $x + 3 = 0$ or $x - 5 = 0$.

Example 1 Translate Sentences into Equations

Write a quadratic equation in standard form with $-\frac{1}{3}$ and 6 as its roots.

SCORE _____

1. Tickets for a spaghetti dinner cost \$4 for children and \$6 for adults. The equation $4x + 6y = 36$ represents the number of children x and adults y who can eat at the dinner for \$36. If no children are eating at the dinner, how many adults can eat for \$36?

2. If $(a, 9)$ is a solution to the equation $-4a = b - 21$, what is a?

3. Find the x-intercept of $x - 2y = 9$.

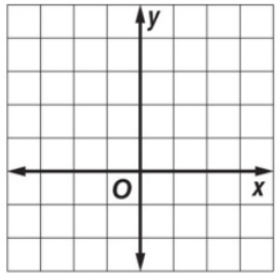
4. skip!

5. Find the root of $9x - 36 = 0$.

1. _____

2. _____

3. _____

4. 

5. _____

For Questions 6 – 8, find the slope of the line passing through each pair of

points. If the slope is undefined, write *undefined*.

6. (2, 5) and (3, 6) — 6. $m = 1$

7. (6, –4) and (–3, 7) — 7. $m = -11/9$

8. (–1, 3) and (6, 3) — 8. $m = 0$

9. In 1972, federal vehicle emission standards allowed 3.4 hydrocarbons released per mile driven. By 2007, the standards allowed only 0.8 hydrocarbons per mile driven. What was the rate of change from 1972 to 2007? — 9. $\frac{.8-3.4}{2007-1972} = \frac{2.6}{35} = \frac{26}{350} = \frac{13}{175}$

10. If a shark can swim 27 miles in 9 hours, how many miles will it swim in 12 hours? — 10. 36 miles

$\frac{27 \text{ miles}}{9 \text{ hours}} = \frac{3 \text{ miles}}{1 \text{ hour}} = \frac{36 \text{ miles}}{12 \text{ hr}}$

For Questions 11 and 12, determine whether each equation is a linear equation. If so, write the equation in standard form.

11. _____

12. _____

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11. _____

12. _____

$Ax + By = C$ $2x + 3y = -4$

11. *skip*

$y = mx + b$

12. $2x + 3y + 7 = 3$

$-7 \quad -7$

$2x + 3y = -4$

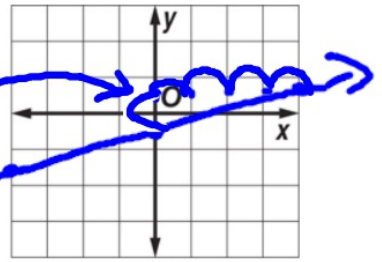
13. Graph the equation $x - 4y = 2$.

$-x \quad -x$

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

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

13.



14. Graph $y = -\frac{1}{2}x$.

$m = -\frac{1}{2}$

15. skip!

16. Determine whether the sequence $-10, -7, -4, -1, \ldots$ is an arithmetic sequence. Write *yes* or *no*. If so, state the common difference.

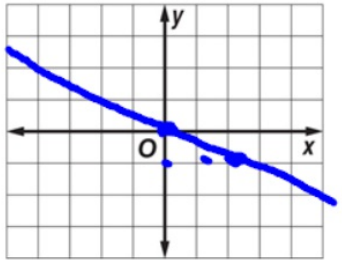
+3

17. Find the next three terms of the arithmetic sequence $8, 15, 22, 29, \ldots$.

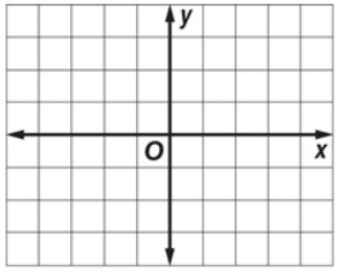
+7...

18. skip

14.



15.



16. yes $d = 3$

17. 36, 43, 50

For Questions 19 and 20, use the table below that shows the amount of gasoline a car consumes for different distances driven.

Distance (mi)	1	2	3	4	5
Gasoline (gal)	0.04	0.08	0.12	0.16	0.20

$y = mx + b$, $b = 0$

19. Write an equation in function notation for the relationship between distance and gasoline used.

19. $f(x) = \frac{1}{25}x$

20. How many gallons will the car consume after driving for 150 miles?

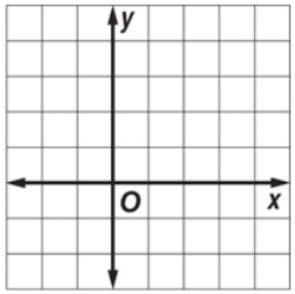
20. $f(150) = 6$

$y = \frac{1}{25}(150)$

$= \frac{150}{25}$

$\frac{0.08 - 0.04}{2 - 1} = \frac{.04}{1} = \frac{4}{100}$

$= \frac{1}{25}$



Bonus Graph $x = 3$, $y = -1$, and $2x - 2y = 0$ on a coordinate plane. Give the vertices of the figure formed by the three lines.

B: