Writing Quadratics Given Roots

Agenda

Warm-Up

HW Check

Notes p. 95

HW: #1-10

Reminders

Quiz Friday!

Essential Question

How do I write equations given the roots of a quadratic?

Warm-Up Tuesday

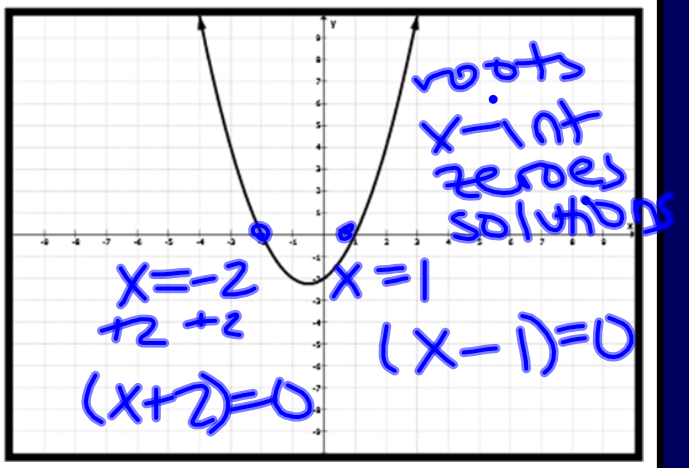
1. Which equation best represents the graph shown?

A $(x-2)(x+1)=y$

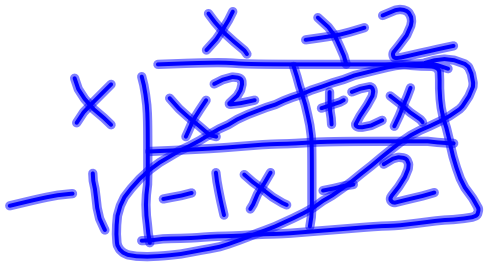
B $(x+2)(x+1)=y$

C $(x+2)(x-1)=y$

D $(x-2)(x-1)=y$



2. Multiply (x+2)(x-1)



x^2+x-2

Questions, Comments, Concerns?

Algebra I – Unit 8: Solving Quadratics by Factoring

Student Practice – Solving Quadratics by Factoring

Name _____ Date _____ Period _____

Solve the equations below by factoring.

1. $(x+3)(x-7)=0$

2. $(3x-2)(4x-3)=0$

3. $x^2-169=0$

diff of squares

a:1 b:0 c:-169

$\{\pm 13\}$

$a^2-b^2=(a-b)(a+b)$

a:x b:13 $(x-13)(x+13)=0$

$x-13=0$ $x+13=0$

$+13\ +13$ $-13\ -13$

$x=13$ $x=-13$

4. $4x^2-12x+9=0$

5. $x^2=8x-16$

6. $12x^2-1=-x$

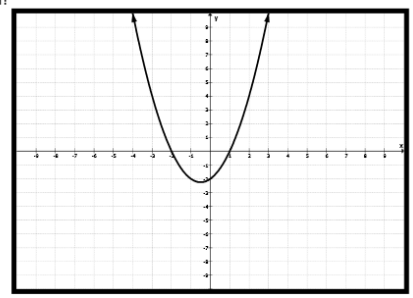
7. $x^2+2x=15$

8. $2x^2=-4-6x$

Algebra I Unit 8- Solving Quadratics by Factoring

9. Which equation best represents the graph shown?

A $(x-2)(x+1)=y$
B $(x+2)(x+1)=y$
C $(x+2)(x-1)=y$
D $(x-2)(x-1)=y$



10. The area of a rectangular floor is described by the equation $w(w-9)=252$ where w is the width of the floor in meters. What is the width of the floor?

11. A group of friends try to keep a beanbag from touching the ground without using their hands. Once the beanbag has been kicked, its height can be modeled by $h=-16t^2+14t+2$, where h is the height in feet above the ground and t is the time in seconds. Find the time it takes the beanbag to reach the ground.

$h=0$

$0=-16t^2+14t+2$

$0=-2(8t^2-7t-1)$

$a:8\ \ b:-7\ \ c:-1$

-8

$-1\ \ 8=7$

$1\ \ -8=-7$

$-2\ \ 4$

$8t+1$

$1t\ \ 8t^2\ \ 1t$

$-1\ \ -8t\ \ -1$

$-2(8t+1)(t-1)=0$

$8t+1=0$

$-1\ \ -1$

$\frac{8t}{8}=\frac{-1}{8}$

$t=-\frac{1}{8}$

$t-1=0$

$+1\ \ +1$

$t=1$

1 sec

12. The length of a rectangle is 3 cm more than the width. The area is 70 square centimeters. Find the dimensions of the rectangle.

Writing Quadratics Given Roots

Essential Question How do I write equations given the roots of a quadratic?

Given the roots, write the equation.

1. The roots are $x : \{-6, 4\}$

$x = -6$ and $x = 4$

$+6 \quad +6 \qquad -4 \quad -4$

$x+6=0 \qquad x-4=0$

$y = (x+6)(x-4)$

	x	$+6$
x	x^2	$+6x$
-4	$-4x$	-24

$x^2 + 2x - 24 = y$

solution
x-intercept
zero

$8x^2 - 7x - 1 = 0$

$(8x+1)(x-1) = 0$

$8x+1=0 \qquad x-1=0$

$-1 \quad -1 \qquad +1 \quad +1$

$\frac{8x}{8} = \frac{-1}{8} \qquad x = 1$

$x = \frac{-1}{8}$

$\{-\frac{1}{8}, 1\}$

Writing Quadratics Given Roots

Essential Question How do I write equations given the roots of a quadratic?

Given the roots, write the equation.

2. The solutions are $x : \{-10, -5\}$

$x = -10$ and $x = -5$

$+10 \quad +10$ $\quad +5 \quad +5$

$x + 10 = 0$ $\quad x + 5 = 0$

- ★ write x= # and x= #
- ★ move everything to one side (solve for 0)
- ★ write factors in parenthesis
- ★ multiply factors using box

$y = (x+10)(x+5)$

	x	$+10$
x	x^2	$10x$
$+5$	$5x$	50

$y = x^2 + 15x + 50$

Writing Quadratics Given Roots

Essential Question How do I write equations given the roots of a quadratic?

Given the roots, write the equation.

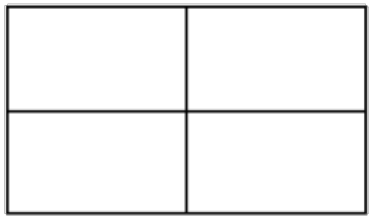
3. The x-intercept is $x = -3$

$+3 \quad +3$

$x+3=0$

* Always two sets of parenthesis

$y = (x+3)(x+3)$



Writing Quadratics Given Roots

Essential Question How do I write equations given the roots of a quadratic?

Given the roots, write the equation.

4. The zeros are $x = \pm\frac{11}{2}$

± → plus or minus
one is + one is −

$2x = \frac{11}{2}$ and $2x = \frac{-11}{2}$

$2x = 11$
$-11 \quad -11$
$2x - 11 = 0$

$2x = -11$
$+11 \quad +11$
$2x + 11 = 0$

$y = (2x - 11)(2x + 11)$

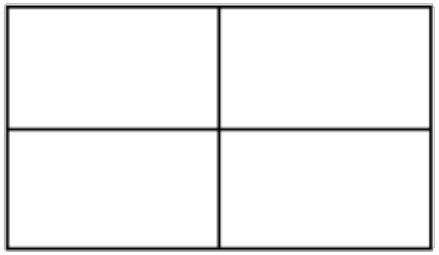
* clear denominator by multiplying

Writing Quadratics Given Roots

Essential Question *How do I write equations given the roots of a quadratic?*

5. The solutions are $x = 6; x = -7$

$y = (\quad)(\quad)$



6. The roots are $x : \{-\frac{2}{7}, -\frac{5}{9}\}$

$7 \cdot x = -\frac{2}{7}$ and $9 \cdot x = -\frac{5}{9}$

$7x = -2$

$+2 \quad +2$

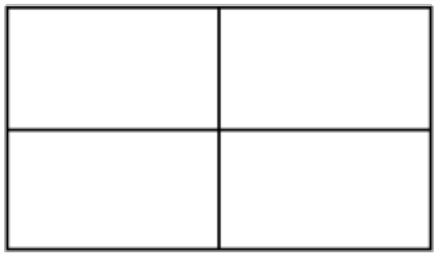
$7x + 2 = 0$

$9x = -5$

$+5 \quad +5$

$9x + 5 = 0$

$y = (7x+2)(9x+5)$

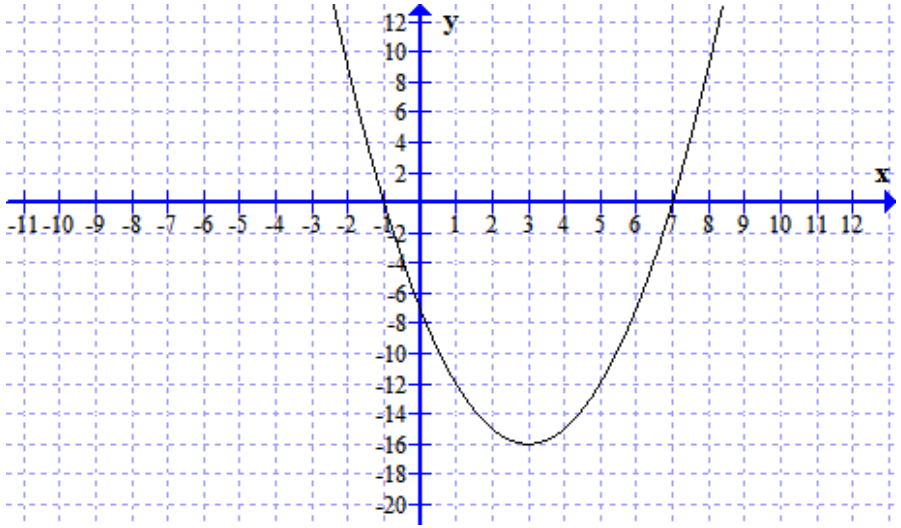


Writing Quadratics Given Roots

Essential Question *How do I write equations given the roots of a quadratic?*

9. Jasmine looked at the following graph and determined the x-intercepts were -1 and 7. What is the equation of the graph?

A. $x^2 - 6x + 7 = 0$
B. $x^2 + 6x - 7 = 0$
C. $x^2 + 6x + 7 = 0$
D. $x^2 - 6x - 7 = 0$



Writing Quadratics Given Roots

Essential Question *How do I write equations given the roots of a quadratic?*

10. Gage and Colby are working together on homework. The roots of a quadratic equation were given as $x:\{-\frac{4}{5},2\}$. Gage says the factors are $(5x-4)\text{and}(x+2)$. Colby says they are $(5x+4)\text{and}(x-2)$. Who is correct?

A. Colby is correct and the equation is $5x^2-6x-8=0$.
B. Gage is correct and the equation is $5x^2+6x-8=0$.
C. Neither is correct and the equation is $5x^2+6x+8=0$
D. There is not enough information to determine the equation.

Algebra I – Unit 8: Writing Quadratic Equations Given Roots

Student Practice – Writing Quadratic Equations Given Roots

Name _____ Date _____ Period _____

You only need to use your box to multiply out on TWO questions on #1-7. You can check your answer using the y1 & y2 calculator short cut.

Given the roots, write the corresponding quadratic equation.

1. $x+3=0$ and $x-7=0$

2. $x:\left\{-\frac{2}{5},4\right\}$

3. $x=4$

4. $x=\pm\frac{3}{4}$

5. $x:\{-.5,6\}$

6. $x=\frac{2}{3}$ and $x=\frac{3}{2}$

7. $x:\{\pm 3\}$

8. The roots of a quadratic equation are 3 and 5. The equation is:

   A. $x^2+8x+15=0$
   B. $x^2+8x-15=0$
   C. $x^2-8x+15=0$
   D. $x^2-8x-15=0$

9. Miranda was given the factors $x=\frac{2}{5}$ and $x=-\frac{1}{3}$ and asked to write the quadratic equation to correspond to those factors. Her work is shown below. Determine which step, if any, contains a mistake.

Step 1: $5x-2=0$ or $3x+1=0$
Step 2: $(5x-2)(3x+1)=0$
Step 3: $8x^2-6x+5x-2=0$
Step 4: $8x^2-x-2=0$

   A. Step 2
   B. Step 3
   C. Step 4
   D. There is no mistake

10. What would be the correct equation for question 9?
   A. The equation was correct
   B. $8x^2+x-2=0$
   C. $15x^2-x-2=0$
   D. $15x^2+x-2=0$

HW Help: Writing Quadratics Given Roots

No Work = No Credit = No Kidding!!

Help...

1. Since each equation is already set equal to zero, put each in a set of parenthesis and multiply!

2. $5 \cdot x = -\frac{2}{5} \cdot 5$

$5x = -2$

$+2 \quad +2$

$5x + 2 = 0$

$x = 4$

$-4 \quad -4$

$x - 4 = 0$

$(5x+2)(x-4) = 0$

	$5x$	$+2$
x	$5x^2$	$+2x$
-4	$-20x$	-8

OR

$5x^2 - 18x - 8 = 0$

3. Remember, there are 2 sets of parenthesis, so make each the same if you only have one root!

4. The plus or minus means that one solution is positive and one is negative! Set up accordingly.

5. Use x=-1/2 for -.5

6. You try!

7. Again, don't forget the negative solution.

8. x=3 and x=5. Set each factor equal to zero & multiply!

9. $(5x)(3x)=15x^2$ not $8x^2$

10. Use your box to multiply in step 2!

Solutions

1. $x^2 - 4x - 21 = 0$
2. $5x^2 - 18x - 8 = 0$
3. $x^2 + 8x + 16 = 0$
4. $16x^2 - 9 = 0$
5. $x^2 - x - 30 = 0$
6. $6x^2 - 13x + 6 = 0$
7. $x^2 - 9 = 0$
8. C
9. B
10. C

You only need to use your box to multiply out on TWO questions on #1-7. You can check your answer using the y1 & y2 calculator short cut.