

Homework Review: HW page 97 X 101

1. $\frac{5x^2}{5} = \frac{500}{5}$

$\sqrt{x^2} = \sqrt{100}$

$x = \pm 10$

2. $\frac{x^2 - 121}{+121 + 121} = 0$

$\sqrt{x^2} = \sqrt{121}$

$x = \pm 11$

3. $\frac{x^2 + 3}{-3 - 3} = 12$

$\sqrt{x^2} = \sqrt{9}$

$x = \pm 3$

4. $\frac{x^2 + 7}{-7 - 7} = -57$

$x^2 = -64$

No Solution

5. $\frac{8x^2 - 8}{+8 + 8} = 27$

$\frac{8x^2}{8} = \frac{32}{8}$

$\sqrt{x^2} = \sqrt{4}$

$x = \pm 2$

6. $\frac{4x^2 - 4}{+4 + 4} = 31$

$\frac{4x^2}{4} = \frac{36}{4}$

$\sqrt{x^2} = \sqrt{9}$

$x = \pm 3$

7. $\frac{\frac{1}{3}x^2 - 20}{+10 + 20} = 55$

$(\frac{1}{3})x^2 = 75$

$\sqrt{x^2} = \sqrt{225}$

$x = \pm 15$

8. $\frac{2x^2 + 3x^2}{5} = 20$

$\frac{5x^2}{5} = \frac{20}{5}$

$\sqrt{x^2} = \sqrt{4}$

$x = \pm 2$

9. $2(x^2 - 4) = 90$
 $\frac{2x^2 - 8}{+8 + 8} = 90$

$\frac{2x^2}{2} = \frac{98}{2}$

$\sqrt{x^2} = \sqrt{49}$

$x = \pm 7$

10. $\frac{6x^2 - 4x^2 + 2}{+2 + 2} = 100$
 $\frac{2x^2 + 2}{+2 + 2} = 100$

$\frac{8x^2}{8} = \frac{98}{8}$

$\sqrt{x^2} = \sqrt{49}$

$x = \pm 7$

11. $\frac{2x^2 - 5x^2}{-3 - 3} = 300$
 $\frac{-3x^2}{-3} = \frac{300}{-3}$

$x^2 = -100$

No Solution

12. $\frac{3x^2 - 50}{-2x^2 + 71} = \frac{2x^2 + 71}{+50}$
 $\frac{-2x^2}{-2} = \frac{+50}{-2}$

$\sqrt{x^2} = \sqrt{121}$

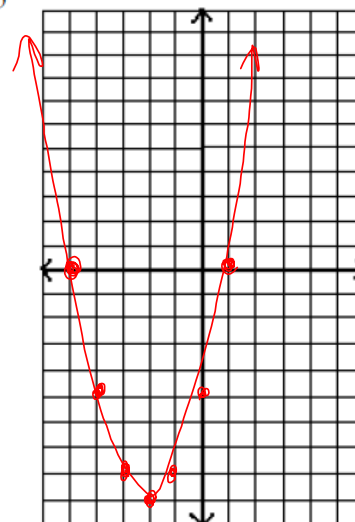
$x = \pm 11$

<p>13. $\frac{8x^2}{3} = \frac{6}{3}$ $\sqrt{x^2} = \sqrt{2}$ $x = \pm 2$</p>	<p>14. $5x^2 + 5 = 20$ $-5 \quad -5$ $\frac{5x^2}{5} = \frac{15}{5}$ $\sqrt{x^2} = \sqrt{3}$ $x = \pm \sqrt{3}$</p>	<p>15. $5x^2 + 13 = 43$ $-13 \quad -13$ $\frac{5x^2}{5} = \frac{30}{5}$ $\sqrt{x^2} = \sqrt{6}$ $x = \pm \sqrt{6}$</p>	<p>16. $\frac{1}{2}x^2 = \frac{100}{2}$ $\sqrt{x^2} = \sqrt{50}$ $x = \pm 5\sqrt{2}$</p>
<p>17. $3x^2 + 7 = 31$ $-7 \quad -7$ $\frac{3x^2}{3} = \frac{24}{3}$ $\sqrt{x^2} = \sqrt{8}$ $x = \pm 2\sqrt{2}$</p>	<p>18. $7x^2 - 84 = 0$ $+84 \quad +84$ $\frac{7x^2}{7} = \frac{84}{7}$ $\sqrt{x^2} = \sqrt{12}$ $x = \pm 2\sqrt{3}$</p>	<p>19. $\frac{1}{2}x^2 - 4 = 20$ $+4 \quad +4$ $(2) \frac{1}{2}x^2 = 24 (2)$ $\sqrt{x^2} = \sqrt{48}$ $x = \pm 4\sqrt{3}$</p>	<p>20. $3(x^2 - 7) = 39$ $3x^2 - 21 = 39$ $+21 \quad +21$ $\frac{3x^2}{3} = \frac{60}{3}$ $\sqrt{x^2} = \sqrt{20}$ $x = \pm 2\sqrt{5}$</p>
<p>21. $-4(x^2 - 5) = -92$ $-4x^2 + 20 = -92$ $+20 \quad +20$ $\frac{-4x^2}{-4} = \frac{-112}{-4}$ $\sqrt{x^2} = \sqrt{28}$ $x = \pm 2\sqrt{7}$</p>	<p>22. $5x^2 + 8 = 2x^2 - 10$ $-2x^2 \quad -8$ $\frac{3x^2}{3} = \frac{-18}{3}$ $x^2 = -6$ No Solution</p>	<p>23. $8x^2 - 40 = 6x^2 + 110$ $-6x^2 \quad -150$ $\frac{2x^2}{2} = \frac{150}{2}$ $\sqrt{x^2} = \sqrt{75}$ $x = \pm 5\sqrt{3}$</p>	<p>24. $\frac{3}{2}x^2 - 2 = \frac{3}{4}x^2 + 13$ $\frac{1}{2}x^2 - 8 = \frac{1}{4}x^2 + 52$ $6x^2 - 8 = 3x^2 + 52$ $-3x^2 \quad -60$ $\frac{-3x^2}{3} = \frac{-60}{3}$ $\sqrt{x^2} = \sqrt{20}$ $x = \pm 2\sqrt{5}$</p>

WARM UP: page 175**10-5 Solving Quadratic Equations in the form $y=ax^2+bx+c$** **Review/Prior Understanding Concept 1:**

Make and study the table and graph for $y = x^2 + 4x - 5$
 Use the domain $\{-5 \leq x \leq 1\}$

x	$x^2 + 4x - 5$	y
-5	$(-5)^2 + 4(-5) - 5$	0
-4		-5
-3		-8
-2		-9
-1		-8
0		-5
1		0



Name the vertex $(-2, -9)$

Name the y-intercept $(0, -5)$

Name the x-intercepts $(1, 0)$ and $(-5, 0)$

What y-values always occur with x-intercepts? 0

How could we use zero to find x-intercepts of a quadratic algebraically?

let $y=0$ and solve for x .

Review/Prior Understanding Concept 2:

Multiplying with zero:

Complete $2 \cdot 0 = \underline{0}$

Complete $x \cdot 0 = \underline{0}$

If $3 \cdot x = 0$, what value of x would make this equation true? 0If $2 \cdot m = 0$, what value of m would make this equation true? 0If $x \cdot m = 0$, do both x and m need to equal zero to make the equation true? noIf $x \cdot m = 0$, what can you definitely say about x or m ? one of them is zeroAdding with zero:If $x + 2 = 0$, what value of x would make this equation true? -2If $x - 3 = 0$, what value of x would make this equation true? 3

Adding and multiplying with zero:

If $x(x + 2) = 0$, what values of x would make this equations true? 0 or -2
-2 (-2+2)If $(x + 2)(x - 3) = 0$, what values of x would make this equation true? -2 or 3

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**Zero – Product Property**

For every real number a and b ,

if $ab = 0$ then either $a = 0$ or $b = 0$

Therefore:

if $(x + 3)(x + 2) = 0$ then either $(x + 3) = 0$ or $(x + 2) = 0$
 $x = -3$ $x = -2$

The idea of Zero-Product Property is based on the idea that if a factor times another factor equals zero, then one of the factors must be equal to zero!

Example 1 : Using Zero Product Property to Solve a Quadratic Equation
Solve for x.

1. $(x+5)(x+2)=0$ 2. $(x-6)(x-3)=0$ 3. $(x+7)(x-2)=0$

$x+5=0$ or $x+2=0$

$x=-5$ or $x=-2$

4. $x(x+6)=0$

5. $x(x-4)=0$

$x=0$ or $x=4$

6. $(2x-3)(5x+2)=0$

$2x-3=0$ or $5x+2=0$

$x=3/2$ or $x=-2/5$

do U.C a, d, e

Example 1 : Using Zero Product Property to Solve a Quadratic Equation

Solve for x.

1. $(x + 5)(x + 2) = 0$

$$x = -5 \text{ or } -2$$

2. $(x - 6)(x - 3) = 0$

$$x = 6 \text{ or } 3$$

3. $(x + 7)(x - 2) = 0$

$$x = -7 \text{ or } 2$$

4. $x(x + 6) = 0$

$$x = 0 \text{ or } -6$$

5. $x(x - 4) = 0$

$$x = 0 \text{ or } 4$$

6. $(2x - 3)(5x + 2) = 0$

$$\begin{array}{l} 2x - 3 = 0 \quad \text{or} \quad 5x + 2 = 0 \\ \quad +3 \quad +3 \quad \quad \quad -2 \quad -2 \\ \hline 2x = 3 \quad \quad \quad 5x = -2 \\ \frac{2x}{2} = \frac{3}{2} \quad \quad \quad \frac{5x}{5} = \frac{-2}{5} \\ \hline x = 3/2 \quad \text{or} \quad x = -2/5 \end{array}$$

✓ Understanding Check:

Solve for x.

a. $(x + 4)(x - 8) = 0$

b. $x(x + 2) = 0$

c. $(6x + 1)(3x - 7) = 0$

$$x = -4 \text{ or } x = 8$$

d. $x(x - 7) = 0$

e. $(x - 5)(9x + 2) = 0$

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

$$x = 0 \text{ or } x = 7$$

$$x = 5 \text{ or } x = -\frac{2}{9}$$

✓ Understanding Check:

Solve for x.

a. $(x + 4)(x - 8) = 0$

$$x = -4 \text{ or } 8$$

b. $x(x + 2) = 0$

$$x = 0 \text{ or } -2$$

c. $(6x + 1)(3x - 7) = 0$

$$\begin{array}{rcl} 6x + 1 = 0 & \text{or} & 3x - 7 = 0 \\ -1 & -1 & +7 \quad +7 \\ \hline 6x = -1 & & 3x = 7 \\ \frac{6x}{6} = \frac{-1}{6} & & \frac{3x}{3} = \frac{7}{3} \\ x = -\frac{1}{6} & \text{or} & x = \frac{7}{3} \end{array}$$

d. $x(x - 7) = 0$

$$x = 0 \text{ or } -7$$

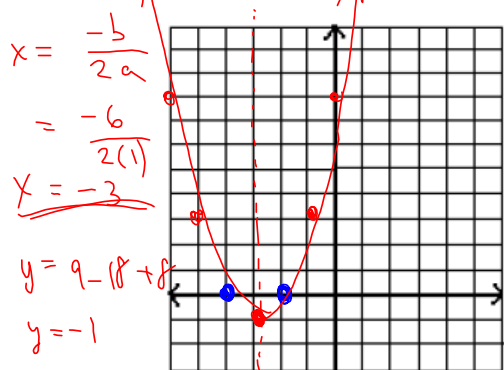
e. $(x - 5)(9x + 2) = 0$

$$x = 5 \text{ or } -\frac{2}{9}$$

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

$$x = 0 \text{ or } \frac{4}{3}$$

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Example 2 : Using Factoring and Zero Product Property to Solve a Quadratic Equation when a = 1.Graph: $y = x^2 + 6x + 8$ Now solve: $x^2 + 6x + 8 = 0$

$$\begin{array}{r} 8 \\ 4 \times 2 \\ \hline 6 \end{array}$$

Step 1: **Factor the trinomial.**Step 2: **Use the zero product property.**Step 3: **Solve for x.**

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

$$x = -4 \text{ or } x = -2 \quad \leftarrow \text{x-intercepts}$$

What are the x-intercepts of the parabola? -4 and -2How do these answers compare to the answers you found algebraically? same

Guided Practice:

Solve by factoring and zero-product property, and name the x-intercepts:

a. $x^2 - 8x - 48 = 0$

b. $0 = x^2 + 5x - 6$

c. $x^2 - 12x = -36$

$$(x-12)(x+4) = 0$$

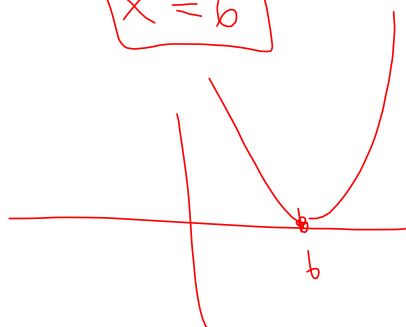
$$\boxed{x = 12 \text{ or } x = -4}$$

$\begin{array}{r} -48 \\ -12 \times 4 \\ -8 \end{array}$

$$x^2 - 12x + 36 = 0$$

$$(x-6)(x-6) = 0$$

$$\boxed{x = 6}$$



Guided Practice Solutions (page 177):

a. $x^2 - 8x - 48 = 0$

$\begin{array}{r} -48 \\ -12 \times 4 \\ -8 \end{array}$

$(x-12)(x+4) = 0$

$x = 12 \text{ or } -4$

$(12, 0) \text{ and } (-4, 0)$

b. $0 = x^2 + 5x - 6$

$\begin{array}{r} -6 \\ 6 \times -1 \\ 5 \end{array}$

$(x+6)(x-1) = 0$

$x = -6 \text{ or } 1$

$(-6, 0) \text{ and } (1, 0)$

c. $x^2 - 12x = -36$

$\begin{array}{r} 36 \\ -6 \times -6 \\ -12 \end{array}$

$x^2 - 12x + 36 = 0$

$(x-6)(x-6) = 0$

$x = 6$

$(6, 0)$

Example 3: Using Factoring and Zero Product Property to Solve a Binomial with a GCF of x:Solve: 1. $x^2 + 4x = 0$

$$x(x + 4) = 0$$

$$x = 0 \text{ or } x = -4$$

Step 1: **Factor**Step 2: **use zero PP**Step 3: **Solve for x.**

a. $x^2 - 6x = 0$

b. $x^2 + 8x = 0$

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

$$x = 0 \text{ or } x = -8$$

c. $2x^2 + 3x = 0$

$$x(2x + 3) = 0$$

$$x = 0 \text{ or } 2x + 3 = 0$$

$$x = 0 \text{ or } x = -\frac{3}{2}$$

a. $x^2 - 6x = 0$

$$x(x-6) = 0$$

$$\boxed{x = 0 \text{ or } 6}$$

b. $x^2 + 8x = 0$

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

$$\boxed{x = 0 \text{ or } -8}$$

c. $2x^2 + 3x = 0$

$$x(2x+3) = 0$$

$$\boxed{x = 0 \text{ or } -3/2}$$

Example 4: Using Factoring and Zero Product Property to Solve a Quadratic when $a \neq 1$:

find x-ints
~~Solve~~ $y = 2x^2 + 5x - 3$

$$0 = 2x^2 + 5x - 3$$

$$0 = (x+3)(2x-1)$$

$$x = -3 \text{ or } x = 1/2$$

Step 1: let $y = 0$

Step 2: factor

Step 3: use ZPP

Step 4: Solve

Super-Secret Shortcut for Factoring Trinomials where $a \neq 1$ – Shhhhhhhh!**✓ Understanding Check:**

a. $2x^2 - 3x - 14 = 0$

b. $3x^2 - 20x + 12 = 0$

c. $8x^2 + 2x = 15$

✓ Understanding Check:

* Let student use any method to factor

a. $2x^2 - 3x - 14 = 0$

$$\frac{-7}{2} \times \frac{4}{2} = \frac{2}{1}$$

$$(2x-7)(x+2) = 0$$

$$x = 7/2 \text{ or } -2$$

b. $3x^2 - 20x + 12 = 0$

$$\frac{-6}{1} \times \frac{-18}{3} = \frac{-2}{3}$$

$$(x-6)(3x-2) = 0$$

$$x = 6 \text{ or } 2/3$$

c. $8x^2 + 2x = 15$

$$8x^2 + 2x - 15 = 0$$

$$\frac{3}{2} \times \frac{12}{8} \times \frac{-10}{8} = \frac{-5}{4}$$

$$(2x+3)(4x-5) = 0$$

$$x = -3/2 \text{ or } 5/4$$

Example 5: Watch out for the ones with Common Factors!:

Solve: $3x^2 - 12x - 36 = 0$

Step 1: factor

$3(x^2 - 4x - 12) = 0$

Step 2: Use ZPPStep 3: Solve

$3(x-6)(x+2) = 0$

$x = 6 \text{ or } x = -2$

$$\begin{array}{r} -12 \\ -6 \quad 2 \\ -4 \end{array}$$

✓ Understanding Check:

a. $2x^2 - 10x + 12 = 0$

b. $y = 5x^2 - 50x + 80 = 0$

$2(x^2 - 5x + 6) = 0$

✓ Understanding Check:

a. $2x^2 - 10x + 12 = 0$

$\sqrt{\frac{2}{2} \quad \frac{-10}{2} \quad \frac{12}{2}}$

$2(x^2 - 5x + 6) = 0$

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

$x-2=0 \text{ or } x-3=0$

$x = 2 \text{ or } 3$

b. $5x^2 - 50x + 80 = 0$

$\sqrt{\frac{5}{5} \quad \frac{-50}{5} \quad \frac{80}{5}}$

$5(x^2 - 10x + 16) = 0$

$5(x-8)(x-2) = 0$

$x-8=0 \text{ or } x-2=0$

$x = 8 \text{ or } 2$

$$\begin{array}{r} 16 \\ -8 \quad -2 \\ -10 \end{array}$$

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Understanding Check:

a. $2x^2 - 3x - 14 = 0$

b.

$$(2x-7)(x+2) = 0$$

$$x = 7/2 \text{ or } x = -2$$

$$M \quad x^2 - 3x - 28$$

$$U \quad (x-7)(x+4)$$

$$D \quad \left(x - \frac{7}{2}\right)\left(x + \frac{4}{2}\right)$$

$$S \quad \left(x - \frac{7}{2}\right)(x+2)$$

$$S \quad (2x-7)(x+2)$$

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Understanding Check:

a. $2x^2 - 10x + 12 = 0$

$$2(x^2 - 5x + 6) = 0$$

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

$$x = 3 \text{ or } x = 2$$

$$\begin{array}{r} b \\ -3 \end{array} \begin{array}{r} -2 \\ -5 \end{array}$$

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