Warm Up April 20, 2018

Writing Quadratic Functions from Roots

Main Ideas/Questions	Notes
What is a "Radical"?	

Simplifying Perfect Square Root Radicals	**1.** $\sqrt{4}$	**2.** $\sqrt{81}$
	3. $\sqrt{256}$	**4.** $\sqrt{121}$
	5. $\sqrt{324}$	**6.** $\sqrt{1}$
	7. $\sqrt{\frac{64}{81}}$	**8.** $\sqrt{\frac{1}{16}}$
	9. $\sqrt{\frac{9}{100}}$	**10.** $\sqrt{\frac{25}{49}}$

Simplifying Non-Perfect Square Root Radicals

To simplify non-perfect square roots,
you need to know at least your first 10 perfect square numbers:

_____, _____, _____, _____, _____, _____, _____, _____, _____, _____,

(Find the ***greatest perfect square*** that goes into the radical)

11. $\sqrt{24}$

12. $\sqrt{48}$

13. $\sqrt{72}$

14. $\sqrt{90}$

15. $\sqrt{175}$

16. $\sqrt{162}$

17. $\sqrt{117}$

18. $\sqrt{245}$

21. $\sqrt{63}$

22. $\sqrt{216}$

Solve the quadratic function below by factoring and graphing:

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

FACTORING

$x^2+4x-5=0$

$a=1 \quad b=4 \quad c=-5$

$ac=-5$

-1	5
1	-5

$\frac{x^2}{x}-\frac{x}{x}+\frac{5x}{5}-\frac{5}{5}=0$

$x(x-1)+5(x-1)=0$

$(x+5)(x-1)=0$

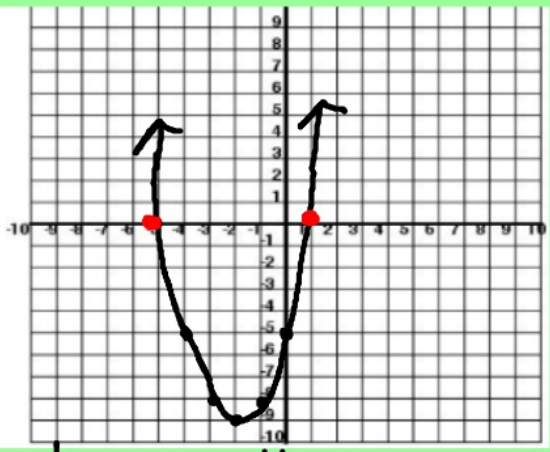
$x+5=0 \quad x-1=0$

$x=-5 \quad x=1$

$-5, 1$

GRAPHING

x	y
-5	0
-4	-5
-3	-8
-2	-9
-1	-8
0	-5
1	0



$x=\frac{-b}{2a}=\frac{-4}{2(1)}$

$x=-2$

$y=(-2)^2+4(-2)-5$

$y=-9 \quad (-2,-9)$

What about polynomials that cannot be factored?

THE QUADRATIC FORMULA

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

https://www.youtube.com/watch?v=VOXYMRcWbF8

Example: $x^2-5x-36 = 0$

$a=1 \quad b=-5 \quad c=-36$

$$x = \frac{5 \pm \sqrt{(-5)^2-4(1)(-36)}}{2(1)}$$

$$x = \frac{5 \pm \sqrt{25+144}}{2}$$

$$x = \frac{5 \pm \sqrt{169}}{2}$$

$$x = \frac{5+13}{2} \qquad x = \frac{5-13}{2}$$

$$x=9 \qquad x=-4$$

$\{-4, 9\}$

1. $x^2 - 8x = 20$

$-20 \quad -20$

$x^2 - 8x - 20 = 0$

$a = 1 \quad b = -8 \quad c = -20$

$$x = \frac{8 \pm \sqrt{(-8)^2 - 4(1)(-20)}}{2(1)}$$

$$x = \frac{8 \pm \sqrt{144}}{2}$$

$$x = \frac{8 \pm 12}{2}$$

$$x = \frac{8+12}{2} \qquad x = \frac{8-12}{2}$$

$$x = 10 \qquad x = -2$$

$$\{-2, 10\}$$

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

$-12 \quad -12$

$2x^2 + 7x - 9 = 0$

$a = 2 \quad b = 7 \quad c = -9$

$$x = \frac{-7 + \sqrt{(7)^2 - 4(2)(-9)}}{2(2)}$$

$$x = \frac{-7 \pm \sqrt{121}}{4}$$

$$x = \frac{-7 \pm 11}{4}$$

$$x = \frac{-7+11}{4} \qquad x = \frac{-7-11}{4}$$

$$x = 1 \qquad x = -\frac{9}{2}$$

$$\{-\frac{9}{2}, 1\}$$

3. $3x^2 - 12 = 0$

4. $x^2 + 15x = 6x$

5. $-x^2 - 10x - 21 = 0$

6. $4x^2 + 9x = 12x$

IRRATIONAL SOLUTIONS

Directions: Solve each equation using the quadratic formula. Write all irrational solutions in simplest radical form.

9. $x^2 + 4x + 1 = 0$

$a=1 \quad b=4 \quad c=1$

$$x=\frac{-4\pm\sqrt{(4)^2-4(1)(1)}}{2(1)}$$

$$x=\frac{-4\pm\sqrt{12}}{2}$$

$\sqrt{12}$

$\sqrt{4\cdot 3}$

$\sqrt{4}\cdot\sqrt{3}$

$2\sqrt{3}$

$$x=\frac{-4\pm 2\sqrt{3}}{2}$$

$$x=-2\pm\sqrt{3}$$

$-2-\sqrt{3} \qquad -2+\sqrt{3}$

$x=-3.73 \qquad x=-.26$

10. $-x^2 - 2x + 7 = 0$

$a=-1 \quad b=-2 \quad c=7$

$$x=\frac{2\pm\sqrt{(-2)^2-4(-1)(7)}}{2(-1)}$$

$$x=\frac{2\pm\sqrt{32}}{-2}$$

$\sqrt{32}$

$\sqrt{16\cdot 2}$

$\sqrt{16}\cdot\sqrt{2}$

$4\sqrt{2}$

$$x=\frac{2\pm 4\sqrt{2}}{-2}$$

$$x=-1\pm(-2\sqrt{2})$$

$x=-1+2\sqrt{2}$

1.82

$x=-1-2\sqrt{2}$

$x=-1.82$

$-1.82 \quad 1.82$