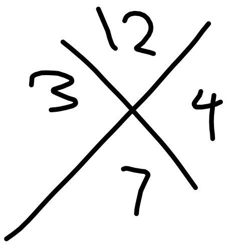
Bellwork: Solve the equation by factoring



$x^2+7x+12=0$

$(x+3)(x+4)=0$

$\boxed{x=-3,-4}$

$(-3)^2+7(-3)+12$

$9-21+12$

$21-21=0$

Test Results:

Class Average: 74

High Score: 100

Lesson 3.1 Objectives

I can solve simple radical equations in one variable and identify extraneous solutions

	even	odd
+	↖ ↗ $x \to -\infty$ $y \to \infty$ $x \to \infty$ $y \to \infty$	↙ ↗ $x \to -\infty$ $y \to -\infty$ $x \to \infty$ $y \to \infty$
−	↙ ↘ $x \to -\infty$ $y \to \infty$ $x \to \infty$ $y \to -\infty$	↖ ↘ $x \to -\infty$ $y \to \infty$ $x \to \infty$ $y \to -\infty$

$$\frac{y_2 - y_1}{x_2 - x_1}$$

2) $-f\left(\frac{1}{4}x\right)+2$ by $\frac{1}{b}$

1. shift up 2
2. up-down flip (reflect over x-axis)
3. horizontal stretch by 4

A **radical equation** is an equation that has a variable in a radicand or a variable with a rational exponent. The **radicand** is the expression under the radical sign. The **index** is the small number outside of the radical sign.

index $\sqrt[n]{k}$ radicand $\qquad \sqrt{2x+3}=4 \qquad (4x-1)^{1/3}=1$

$$\sqrt[3]{4x-1}=1$$

To solve a radical equation:

- isolate the radical on one side of the equation
- raise each side to the power of the index
- simplify (solve for x)
- check solutions in the original equation to eliminate any extraneous solutions

To solve a radical equation:

Solve $4+\sqrt{3x+10}=9$

$-4 \qquad -4$

$(\sqrt{3x+10})^2=(5)^2$

$3x+10=25$

$-10 \quad -10$

$\frac{3x}{3}=\frac{15}{3}$ $\quad x=5$

- isolate the radical on one side of the equation ✓
- raise each side to the power of the index ✓
- simplify ✓ PEMDAS
- check solutions in the original equation to eliminate any extraneous solutions

CHECK 5:

$4+\sqrt{3(5)+10}=4+\sqrt{25}$

$=4+5=9$ ✓

Solve $-1+\sqrt[3]{2x-5}=2$

$+1 \qquad +1$

$\left(\sqrt[3]{2x-5}\right)^3=(3)^3$

$2x-5=27$

$+5 \quad +5$

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

$x=16$

CHECK 16:

$-1+\sqrt[3]{2(16)-5}$ ✓

$-1+\sqrt[3]{27}=-1+3=2$

Solve $\sqrt{x+9}-7=x+7$

$+7$

$\left(\sqrt{x+9}\right)^2=(x+7)^2$

$(x+7)(x+7)$

	x	$+7$
x	x^2	$7x$
$+7$	$7x$	49

$x+9=x^2+14x+49$

$-1x \ -9 \qquad -1x \ -9$

$0=x^2+13x+40$

$0=(x+5)(x+8)$

$\boxed{x=-5}$ $\cancel{-8}$

40: 8, 5; 13

CHECK -5:

$\sqrt{-5+9}-7=-5$

$\sqrt{4}-7$ ✓

$2-7$

CHECK -8:

$\sqrt{-8+9}-7=-8$

$\sqrt{1}-7=-6$ ✗

$1-7$

13)

Solve $\sqrt{3x+1} - \cancel{\sqrt{x+1}} = 2 + \sqrt{x+1}$

$+ \cancel{\sqrt{x+1}}$

$(x+y)^2 = x^2 + 2xy + y^2$

$\left(\sqrt{3x+1}\right)^2 = \left(2 + \sqrt{x+1}\right)^2$

$3x+1 = 4 + 4\sqrt{x+1} + x+1$

$2 \cdot 2\sqrt{x+1}$

$3x+1 = 4\sqrt{x+1} + \cancel{x} + \cancel{5}$

$-x \; -5 \qquad -\cancel{x} - \cancel{5}$

$\dfrac{2x-4}{4} = \dfrac{\cancel{4}\sqrt{x+1}}{\cancel{4}}$

$\left(\dfrac{x-2}{2}\right)^2 = \left(\sqrt{x+1}\right)^2$

$4 \cdot \dfrac{x^2-4x+4}{\cancel{4}} = (x+1)4$

$x^2 - 4x + \cancel{4} = \cancel{4x} + \cancel{4}$

$-4x \; \cancel{-4} \quad -\cancel{4x} - \cancel{4}$

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

0, −8; 0, −8

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

$x = \cancel{0}, 8$ $\quad x = 8$

CHECK 0: NO!

$\sqrt{3(0)+1} - \sqrt{0+1} = 2$

$\sqrt{1} - \sqrt{1} = 0 \times$

CHECK 8: YES!

$\sqrt{3(8)+1} - \sqrt{8+1} = 2$

$\sqrt{25} - \sqrt{9} = 5 - 3 = 2$

9) $\sqrt{x-2} + \cancel{4} = 2$

$\quad -\cancel{4} \quad -4$

$\left(\sqrt{x-2}\right)^2 = (-2)^2$

$x - \cancel{2} = 4$

$+\cancel{2} \quad +2$

~~x = 6~~

CHECK: $\sqrt{6-2} + 4$

$\sqrt{4} + 4 = 2 + 4 = 6 \neq 2$

$\boxed{\text{No solution}}$