Alg. 1 BE | Monday 3-14-11

Welcome Back ☺. Happy π Day!

1. Find the equation of the line through $(-2, 7)$, $(2, 3)$. Graph the line.
2. Find the equation of the line through $(-1, -4)$, $(3, 0)$. Graph the line on the same graph as #1.
3. Solve: $\begin{cases} y = -x + 5 \\ y = x - 3 \end{cases}$
4. Simplify $\sqrt{24}$
5. Simplify $\frac{2}{\sqrt{6}}$

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How would you solve $x^2 = 19$ ?

How about $\sqrt{x} = 19$ ?

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RADICAL EQUATIONS

EQUATIONS WITH VARIABLES UNDER THE RADICAL SIGN.

Ex) $\sqrt{x+4} = 6$

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Q How to solve radical equations?

A Get the "radical term" by itself, then square both sides. Solve. Always check.

Ex) $\sqrt{x+4} = 6$

$(\sqrt{x+4})^2 = 6^2$

$x+4 = 36 \quad \therefore \boxed{x=32}$

CK $\sqrt{(\ )+4} \stackrel{?}{=} 6$

$\sqrt{(32)+4} \stackrel{?}{=} 6$ ✓

**Q** Why always check?

**A** Recall that the number of solutions to an equation equals the degree of the equation...

ex) Linear $\Rightarrow x^1 \Rightarrow$ one solution

ex) Quadratic $\Rightarrow x^2 \Rightarrow$ two solutions $x = \frac{-b \pm \sqrt{d}}{2a}$

ex) Cubic $\Rightarrow x^3 \Rightarrow$ three solutions

⋮

etc.

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But squaring both sides of a radical equation changes its degree and may create a false solution.

↑

called an **extraneous solution**.

(d* ↗ ↖ extra, unnecessary

# Ch. 11-3 Radical Equations

Ex 3 Pg 599

$$\sqrt{x+2} = x-4$$

$$\left(\sqrt{x+2}\right)^2 = (x-4)^2$$

Perfect Square Trinomial pattern

$$x+2 = x^2-8x+16$$
$$-x-2 \qquad -x-2$$

$$0 = x^2-9x+14$$

$a=1$, $b=-9$, $c=14$

$b^2-4ac$

$(-9)^2-4(1)(14)$

$81-56 = \boxed{25=D}$

$$x = \frac{-b\pm\sqrt{D}}{2a} = \frac{9\pm5}{2}$$

$x = \{7, 2\}$

Perfect Square, could FACTOR using MAGIC NUMBERS

Ck $x=7$: $\sqrt{(\ )+2} \stackrel{?}{=} x-4$

$\sqrt{9} \stackrel{?}{=} (7)-4$

$3 \stackrel{?}{=} 3$ ✓

Ck $x=2$: $\sqrt{(2)+2} \stackrel{?}{=} (2)-4$

$\sqrt{4} \stackrel{?}{=} -2$

$2 \neq -2$ NO

NOTE: $-\sqrt{4} = -2$

$\therefore \boxed{x=\{7\}}$

Ex) $\sqrt{8x} + 1 = 5$

$\sqrt{8x} = 4$

$8x = 16 \quad \therefore x = 2$

CK $x=2$ $\quad \sqrt{8(2)} + 1 \stackrel{?}{=} 5$

$4 + 1 = 5$ ✓ $\quad \therefore \boxed{x = \{2\}}$

Ex) $\sqrt{2x} = -8$

$2x = 64$

$x = 32$

CK $x=32$ $\quad \sqrt{2(32)} \stackrel{?}{=} -8$

$\sqrt{64} = -8$

$8 \neq -8$

$\therefore$ **NO SOLUTION**

(Ex) $4 + \sqrt{x-2} = x$

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

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

$x - 2 = x^2 - 8x + 16$

$-x + 2 \qquad -x + 2$

$x^2 - 9x + 18 = 0$

SUM ⇒ $-9$

PROD ⇒ $18$

$-3 \quad -6$

$\therefore (x-3)(x-6) = 0 \qquad \therefore x = 3, 6$

CK $x=3$: $4 + \sqrt{(\,)-2} \stackrel{?}{=} (\,)$

$4 + \sqrt{1} \stackrel{?}{=} 3$

$5 \neq 3$

$x=3$ IS AN EXTRANEOUS SOLUTION

CK $x=6$: $4 + \sqrt{(\,)-2} \stackrel{?}{=} (\,)$

$4 + \sqrt{4} \stackrel{?}{=} 6$

$4 + 2 \stackrel{?}{=} 6$ ✓

$\therefore \boxed{x = \{6\}}$

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- Homework: ① Read Ch. 11-3 ② Pg 601 17-19, 26-28, 33, 35-37.