12.2 Operations w/ Radical Expressions

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Recall

$2x + 5x = 7x$

$3x + 2y + 2x =$

$5x + 2y$

$2\sqrt{2} + \sqrt{5} - 6\sqrt{2}$

$-4\sqrt{2} + \sqrt{5}$

Treat the $\sqrt{}$ as you would a Varible

$5\sqrt{3} + \sqrt{12}$

$5\sqrt{3} + \sqrt{4}\cdot\sqrt{3}$

$5\sqrt{3} + 2\sqrt{3}$

$7\sqrt{3}$

3 Rules of Rad.

I. No. P.S. Factor in the Rad.

II. No Fruc. inside the Rad.

III. No Rad in the Denom. of a Frac.

All Radicals Must Be Simplified Befae we can Combine them!

Recall

$\sqrt{2} \cdot \sqrt{8} = \sqrt{16} = 4$

$\sqrt{9 \cdot 5} = \sqrt{9} \cdot \sqrt{5}$

$\sqrt{2}(5 - \sqrt{3})$

$\sqrt{2}(5) - \sqrt{2}(\sqrt{3})$

$5\sqrt{2} - \sqrt{6}$

$(2 + \sqrt{3})(3 + \sqrt{3})$

$2(3) + 2(\sqrt{3}) + \sqrt{3}(3) + \sqrt{3}(\sqrt{3})$

$6 + 2\sqrt{3} + 3\sqrt{3} + 3$

$9 + 5\sqrt{3}$

ex4

$(2+\sqrt{5})(2-\sqrt{5}) =$

$2(2) + 2(-\sqrt{5}) + \sqrt{5}(2) + \sqrt{5}(-\sqrt{5})$

$4 - 2\sqrt{5} + 2\sqrt{5} - 5 = -1$

Recall

$\frac{3}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{3\sqrt{5}}{5}$

$\frac{1}{(2-\sqrt{3})} \cdot \frac{(2+\sqrt{3})}{(2+\sqrt{3})} = \frac{(2+\sqrt{3})}{4-3}$

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

$= (2+\sqrt{3})$

O.T.L.

Pg 698: Checkpoint: 1-6 all

699: Checkpoint: 7-9 all

Checkpoint: 10-13 all

Solving Radical Expressions

if $a = b$

then $a^2 = b^2$

$(\sqrt{x+1})^2 = (5)^2$

$x+1 = 25$

$-1 \quad -1$

$x = 24$

Recall

$x - 7 = 10$

$+7 \quad +7$

$x = 17$

$\sqrt{x} - 7 = 10$

$+7 \quad +7$

$(\sqrt{x})^2 = (17)^2$

$x = 289$

Always trying to get the Variable By itself, But Now First get the radical By itself.

ex 2

$$\left(\sqrt{x+4}\right)^2 = (15)^2$$

$$x + 4 = 225$$

$$-4 \qquad -4$$

$$x = 221$$

ex 3

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

$$+3 \quad +3$$

$$\left(\sqrt{3x+1}\right)^2 = (4)^2$$

$$3x + 1 = 16$$

$$-1 \quad -1$$

$$3x = 15$$

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

$$x = 5$$

ex 3

$$4 = 7 - \sqrt{33x-2}$$

$-7 \quad -7$

$$-3 = -\sqrt{33x-2}$$

$-1 \qquad -1$

$$(3)^2 = (\sqrt{33x-2})^2$$

$$9 = 33x - 2$$

$+2 \qquad +2$

$$11 = 33x$$

$33 \qquad 33$

$$\frac{1}{3} = x$$

ex 3

$$4 = 7 + \sqrt{33x - 2}$$

$$-7 \quad -7$$

$$-3 = \sqrt{33x - 2}$$

No Solution

$(x)^2 = (\sqrt{8-2x})^2$

$x^2 = 8 - 2x$

$+2x \quad -8 \quad -8 + 2x$

$x^2 + 2x - 8 = 0$ (1 : 8, a : 4)

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

$x - 2 = 0$ or $x + 4 = 0$

$+2 \quad +2 \qquad -4 \quad -4$

$x = 2$ or $x = -4$

$2 \stackrel{?}{=} \sqrt{8-2(2)}$

$2 \stackrel{?}{=} \sqrt{8-4}$

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

$2 = 2$ ✓

$-4 \stackrel{?}{=} \sqrt{8-2(-4)}$

$-4 \stackrel{?}{=} \sqrt{8+8}$

$-4 \stackrel{?}{=} \sqrt{16}$

$-4 = 4$ NO

The only Solution for this Problem is $x = 2$

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

$x+2 = x^2$

$-x \quad -2 \qquad -x \quad -2$

$0 = x^2 - x - 2$ 1.2

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

$x+1=0$ or $x-2=0$

$-1 \quad -1 \qquad +2 \quad +2$

$x=-1$ or $x=2$

The only solution is $x=2$

We cannot have the Square Root of Something be a Negative #.

$$\sqrt{x} + 13 = 12$$
$$-13 \quad -13$$
$$\sqrt{x} = -1$$

No Solution

The S.R. of any # cannot be a Negative #.

O.T.L.

Pg 707: 24-32 even

708: 41-530