Check-Up...

Rationalize and simplify...

$$\frac{3\sqrt{20} - 5\sqrt{98}}{-\sqrt{45} + 2\sqrt{50}}$$

$$\sqrt{25} = 5$$

$$\frac{3(2\sqrt{5}) - 5(7\sqrt{2})}{-3\sqrt{5} + 2(5\sqrt{2})}$$

$$\frac{(6\sqrt{5} - 35\sqrt{2})}{-3\sqrt{5} + 10\sqrt{2}} \left(\frac{-3\sqrt{5} - 10\sqrt{2}}{-3\sqrt{5} - 10\sqrt{2}}\right)$$

$$= \frac{-18(5) - 60\sqrt{10} + 105\sqrt{10} + 350(2)}{9(5) - 100(2)}$$

$$= \frac{\overset{\div 5}{610} + \overset{\div 5}{45\sqrt{10}}}{-155 \div 5}$$

$$= \frac{122 + 9\sqrt{10}}{-31} \quad \text{or} \quad \frac{-122 - 9\sqrt{10}}{31} \quad \text{or} \quad \frac{-122}{31} - \frac{9\sqrt{10}}{31}$$

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Quiz Tomorrow....Sections 5.1 and 5.2 from textbook

- Restrictions
- Simplifying radicals
- Adding and subtracting radical expressions
- Multiplying radical expressions
- Division of radical expressions (Rationalizing)

If you are looking for more practice....   Page 304
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23. $A(\sqrt{27}, -\sqrt{50})$ $B(3\sqrt{48}, 2\sqrt{98})$

$MP = \left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2} \right)$

$= \left(\dfrac{3\sqrt{3} + 12\sqrt{3}}{2}, \dfrac{-5\sqrt{2} + 14\sqrt{2}}{2} \right)$

$\left(\dfrac{15\sqrt{3}}{2}, \dfrac{9\sqrt{2}}{2} \right)$

Radical Equations

Focus on...

- solving equations involving square roots
- determining the roots of a radical equation algebraically
- identifying restrictions on the values for the variable in a radical equation
- modelling and solving problems with radical equations

VOCABULARY

Radical equation An equation that contains radicals with the variable in the radicand

Extraneous solution An apparent solution that does not make the original equation true

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$$\sqrt{x} + 3 = 9$$

Radical Equation

$$x + \sqrt{3} = 9$$

Not a radical Equation

SOLVING RADICAL EQUATIONS

To solve a radical equation, follow these steps:

Step 1 **Isolate** the radical on __one side__ of the equation, if necessary. ✓

Step 2 **Raise** each side of the equation to the same __power__ to eliminate the radical.

Step 3 **Solve** the resulting __equation__ using techniques that you learned in previous chapters.

Step 4 **Check** your solution.

Example 1   *Solve a Radical Equation*

Solve $\left(\sqrt{x + 6}\right)^2 = (3.)^2$

$$x + 6 = 9$$

$$x = 9 - 6$$

$$\boxed{x = 3}$$

$\underline{\text{Verify:}}$

$\text{original question} \rightarrow \sqrt{3 + 6}$ $\dfrac{LS}{3}$

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$(x + y)^2 = (8)^2$

$\underline{NOT}$

$x^2 + 16 = 64$

ex

$7^2 + 3^2 = 10^2$

$\cancel{49 + 9 \neq 100}$

$(7 + 3)^2 = 10^2$

$10^2 = 10^2$ ✓

Example 4 *Solve an Equation with Rational Exponents*

Solve $(3x + 4)^{2/3} = 16$. Check for extraneous solutions.

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

$\left(x^{\frac{3}{5}}\right)^{\frac{5}{3}} = x^1$

Reciprocals have a Product of 1

$\left[(3x+4)^{\frac{2}{3}}\right]^{\frac{3}{2}} = 16^{\frac{3}{2}}$

$3x+4 = \left(\sqrt{16}\right)^3$

$3x+4 = 64$

$3x = 60$

$x = 20$

$\underline{\underline{LS}}$

$(3(20)+4)^{\frac{2}{3}}$

$64^{\frac{2}{3}}$

16

$\underline{\underline{RS}}$

16

$LS = RS$

Example 2   *Solve an Equation with Two Radicals*

Solve $\sqrt{2x + 1} - \sqrt{10 - x} = 0.$

$$\left(\sqrt{2x+1}\right)^2 = \left(\sqrt{10-x}\right)^2$$

$$2x+1 = 10-x$$

$$3x = 9$$

$$x = 3$$

ISOLATE!!

Verify:

$$\underset{LS}{\sqrt{7} - \sqrt{7}}\ \bigg|\ \underset{RS}{0}$$

$$0$$

$$\underline{LS = RS}$$

Example 3 — Solve an Equation with an Extraneous Solution

Solve $x - 2 = \sqrt{x + 10}$. Check for extraneous solutions.

$$4 = 4$$

$$(x - 2)^2 = \left(\sqrt{x + 10}\right)^2$$

$$x^2 - 4x + 4 = x + 10$$

$$x^2 - 5x - 6 = 0$$

Factoring $\quad \dfrac{-6}{-6 + 1} \times \dfrac{1}{=-5} = -6$ $\quad$ Formula

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

$$x - 6 = 0 \quad \text{or} \quad x + 1 = 0$$

$$x = 6 \qquad \qquad x = -1$$

extraneous root

$-2 \quad \sqrt{9}$

$\quad 3$

$LS \neq RS$

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