

Check-Up...

Rationalize and simplify...

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

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

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

Binomial

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

$$\frac{-90 + 45\sqrt{10} + 700}{45 - 200}$$

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

$$\frac{-122 + 9\sqrt{10}}{-31}$$

OR

$$\frac{-122 - 9\sqrt{10}}{31}$$

OR

$$= -\frac{122}{31} - \frac{9}{31}\sqrt{10}$$

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)

Quiz:

If you are looking for more practice.... Page 304
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$$17. \left(\frac{1+\sqrt{5}}{2-\sqrt{3}} \right) \left(\frac{1-\sqrt{5}}{2-\sqrt{3}} \right) \left(\frac{2+\sqrt{3}}{2+\sqrt{3}} \right) \left(\frac{2+\sqrt{3}}{2+\sqrt{3}} \right)$$

$$= \frac{(1-5)(4+2\sqrt{3}+2\sqrt{3}+3)}{(4-3)(1)}$$

$$= -4(7+4\sqrt{3})$$

$$= -28-16\sqrt{3}$$

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

$$\sqrt{x} - 6 = 10$$

$$x - \sqrt{6} = 10$$

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.** ✓

$$(3+4)^2 = (7)^2$$

~~$$9+16=49$$~~

(an Not Square
Each TERM

Separately

Example 1

Solve a Radical Equation

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

$$x+6=9$$

$$x=3$$

Verify: (in original)

<u>LS</u>		<u>RS</u>
$\sqrt{3+6}$		3
$\sqrt{9}$		
=3		
LS=RS		

Example 4 Solve an Equation with Rational Exponents

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

$$\begin{aligned} & \left[(x+6)^{1/2} \right]^2 = (3)^2 \\ & \downarrow \\ & x+6 = 9 \\ & \downarrow \\ & \left[(3x+4)^{2/3} \right]^{3/2} = (16)^{3/2} \quad \leftarrow \text{Reciprocal} \\ & 3x+4 = 64 \\ & \frac{3x}{3} = \frac{60}{3} \\ & x = 20 \end{aligned}$$

Verify:

<u>LS</u>		<u>RS</u>
$(3(20)+4)^{2/3}$		16
$64^{2/3}$		
16		
$\leftarrow \text{LS} = \text{RS}$		

Example 2 Solve an Equation with Two Radicals

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

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

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

$$3x = 9$$

$$x = 3$$

$$\implies \sqrt{7} - \sqrt{7} \quad \bigg| \quad \frac{RS}{0}$$

0 CS=RS

Example 3 Solve an Equation with an Extraneous Solution

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

$$(x-2)^2 = (\sqrt{x+10})^2$$
$$x^2 - 4x + 4 = x + 10$$

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

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

$$x = -6$$

$$x-6=0 \text{ or } x+1=0 \quad t = -5$$

$$x=6$$

$$x=-1$$

Verify:

extraneous solution

Quadratic Formula

$$ax^2 + bx + c = 0$$

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