Warm Up

Put into Standard Form

1) $3x^2(4x - 10 + 5x^2 + x^5)$

$12x^3 - 30x^2 + 15x^4 + 3x^7$

$3x^7 + 15x^4 + 12x^3 - 30x^2$

2) $(3x - 1)(5 - 2x)$

	$3x$	-1
5	$15x$	-5
$-2x$	$-6x^2$	$2x$

$-6x^2 + 17x - 5$

Ch.10 Test - 80 pts

A - 72

B - 64

C - 56

D - 48

Solving Proportions wkst

(about 15 mins)

11.1 Notes

11.1 Ratio and Proportion

Goals
- Solve proportions.
- Use proportions to solve real-life problems.

VOCABULARY

Proportion 2 ratios that are equal

Extremes $\frac{a}{b} = \frac{c}{d}$, a & d are the extremes

Means $\frac{a}{b} = \frac{c}{d}$, b & c are the means

Solving the proportion
finding the value of that variable

Extraneous solution
Soln that does not satisfy the original eqn.

PROPERTIES OF PROPORTIONS

Reciprocal Property

If two ratios are equal, their reciprocals, if they exist, are also equal. "flip"

If $\frac{a}{b} = \frac{c}{d}$, then $\frac{b}{a} = \frac{d}{c}$. **Example:** $\frac{2}{3} = \frac{4}{6}$ ➡ $\frac{3}{2} = \frac{6}{4}$

Cross Product Property

The product of the Extremes equals the product of the Means.

If $\frac{a}{b} = \frac{c}{d}$, then $ad = bc$. **Example:** $\frac{2}{3} = \frac{4}{6}$ ➡ $2 \cdot 6 = 3 \cdot 4$

$12 = 12$ ✓

$\frac{4}{y} = \frac{3}{7}$

$\frac{28}{3} = \frac{3y}{3}$

$y = \frac{28}{3}$

Example 1 *Using the Reciprocal Property*

Solve the proportion $\frac{4}{y} = \frac{3}{7}$. ✓

Solution

$\frac{4}{y} = \frac{3}{7}$ **Write original proportion.**

$4 \cdot \frac{y}{4} = \frac{7}{3} \cdot \frac{4}{1}$ **Use reciprocal property.**

$y = \frac{7 \cdot 4}{3 \cdot 1}$ **Multiply each side by ___ .**

$y = \frac{28}{3}$ **Simplify.**

Check When you substitute to check, $\frac{4}{\boxed{\frac{28}{3}}}$ becomes $4 \cdot \frac{3}{28}$ which simplifies to $\frac{3}{7}$. ✓

Example 2 *Using the Cross Product Property*

Solve the proportion $\frac{x}{16} = \frac{4}{x}$.

Solution

$\frac{x}{16} = \frac{4}{x}$ **Write original proportion.**

$x \cdot x = 16 \cdot 4$ **Use cross product property.** $\frac{x}{16} \times \frac{4}{x}$

$\sqrt{x^{\boxed{2}}} = \sqrt{64}$ **Simplify.**

$x = \pm 8$ **Take square root of each side.**

Answer The solutions are $x = 8$ and $x = -8$. Check these in the original proportion.

Remember to check your solution in the original proportion. Notice that Example 2 has two solutions so you need to check both of them.

Example 3 ***Checking Solutions***

When you solve the proportion $\frac{x^2 - 16}{x + 4} = \frac{x - 4}{3}$, you get two possible solutions: $x = 4$ and $x = -4$. Check these by substituting in the original proportion.

$3(x^2 - 16) = (x+4)(x-4)$

$3x^2 - 48 = x^2 - 4x + 4x - 16$

$3x^2 - 48 = x^2 - 16$

$-x^2 + 48 \quad -x^2 + 48$

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

$\sqrt{x^2} = \sqrt{16}$

$x = \pm 4$

$x = 4 \qquad x = -4$

Solution

Check each solution by substituting it into the original proportion.

$x =$ ___ :

$$\frac{x^2 - 16}{x + 4} = \frac{x - 4}{3}$$

$$\frac{\square^2 - 16}{\square + 4} \stackrel{?}{=} \frac{\square - 4}{3}$$

___ $\stackrel{?}{=}$ ___

___

$x =$ ___ :

$$\frac{x^2 - 16}{x + 4} = \frac{x - 4}{3}$$

$$\frac{(\square)^2 - 16}{(\square) + 4} \stackrel{?}{=} \frac{(\square) - 4}{3}$$

___

Answer You can conclude that $x =$ ___ is extraneous because the check results in a ___ statement. The only solution is $x =$ ___ .

Homework

1) Finish "Solving Proportions" wkst

2) Do the Checkpoints #1-6 in Notes

Checkpoint **Solve the proportion. Check for extraneous solutions.**

1. $\frac{5}{y} = \frac{4}{9}$	**2.** $\frac{3}{8} = \frac{2}{x}$	**3.** $\frac{4}{7} = \frac{2u}{5}$
4. $\frac{v + 2}{4} = \frac{v}{3}$	**5.** $\frac{3}{y} = \frac{2y + 1}{5}$	**6.** $\frac{m}{4m} = \frac{2m - 1}{3}$