Chapter 11.1-11.3 Quiz Review

Name: **KEY**

Section 11.1: *Proportions*

Solve the proportions using cross multiplication.

1.) $\frac{5x}{3} \bowtie \frac{5}{6}$

$6 \cdot 5x = 3 \cdot 5$

$30x = 15$

$\boxed{x = \frac{1}{2}}$

2.) $\frac{x+7}{10} \bowtie \frac{4}{3}$

$3(x+7) = 10 \cdot 4$

$3x + 21 = 40$

$3x = 19$

$\boxed{x = \frac{19}{3}}$

3.) $\frac{1}{x+1} \bowtie \frac{x}{2}$

$x(x+1) = 2 \cdot 1$

$x^2 + x = 2$ -2

$x^2 + x - 2 = 0$ $-1 \quad +2$

$x^2 + 2x | -1x - 2 = 0$

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

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

$\boxed{x = -2}$ $\boxed{x = 1}$

4.) $\frac{x+6}{3} \bowtie \frac{x-5}{2}$

$2(x+6) = 3(x-5)$

$2x + 12 = 3x - 15$

$12 = x - 15$

$\boxed{x = 27}$

5.) $\frac{6x+4}{5} \bowtie \frac{2}{x}$

$x(6x+4) = 2 \cdot 5$ $6 \cdot -10 = -60$

$6x^2 + 4x = 10$ $-6 \quad 10$

$6x^2 + 4x - 10 = 0$

$6x^2 + 10x - 6x - 10 = 0$

$2x(3x+5) - 2(3x+5) = 0$

$(3x+5)(2x-2) = 0$

$\boxed{x = \frac{-5}{3}}$ $\boxed{x = 1}$

6.) $\frac{9-x}{x+4} \bowtie \frac{5}{2x}$

$2x(9-x) = 5(x+4)$

$18x - 2x^2 = 5x + 20$ $2 \cdot 20 = 40$

$0 = 2x^2 - 13x + 20$ $-13 = -8 + -5$

$0 = 2x^2 - 8x | -5x + 20$

$0 = 2x(x-4) - 5(x-4)$

$0 = (x-4)(2x-5)$

$\boxed{x = 4}$ $\boxed{x = \frac{5}{2}}$

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Section 11.2: *Direct and Inverse Variation*

The variables x and y vary <u>directly</u>. Use the given values to write an <u>equation</u> that relates x and y.

7.) $x = 8$, $y = 24$

$$y = kx$$
$$24 = k \cdot 8$$
$$k = 3$$
$$\boxed{y = 3x}$$

8.) $x = 18$, $y = 6$

$$y = kx$$
$$6 = k \cdot 18$$
$$k = \frac{1}{3}$$
$$\boxed{y = \frac{1}{3}x}$$

The variables x and y vary ~~directly~~ inversely. Use the given values to write an <u>equation</u> that relates x and y.

9.) $x = 11$, $y = 2$

$$y = \frac{k}{x}$$
$$2 = \frac{k}{11}$$
$$k = 22$$
$$\boxed{y = \frac{22}{x}}$$

10.) $x = \frac{1}{2}$, $y = 8$

$$y = \frac{k}{x}$$
$$8 = \frac{k}{\frac{1}{2}}$$
$$k = 4$$
$$\boxed{y = \frac{4}{x}}$$

Section 11.3: *Simplifying Rational Expressions*

Simplify the expression if possible.

11.) $\dfrac{10x^5}{16x^3}$ $\dfrac{5 \cdot 2 \cdot x \cdot x \cdot x \cdot x \cdot x}{2 \cdot 2 \cdot 2 \cdot 2 \cdot x \cdot x \cdot x}$

$$\boxed{\dfrac{5x^2}{8}}$$

12.) $\dfrac{18x^2}{12x}$ $\dfrac{3 \cdot 3 \cdot 2 \cdot x \cdot x}{3 \cdot 2 \cdot 2 \cdot x}$

$$\boxed{\dfrac{3x}{2}}$$

13.) $\dfrac{7x}{12x + x^2}$ $\dfrac{7 \cdot x}{x(12 + x)}$

$$\boxed{\dfrac{7}{12 + x}}$$

14.) $\dfrac{42x - 6x^3}{36x}$ $\dfrac{6x(7 - x^2)}{3 \cdot 2 \cdot 3 \cdot 2 \cdot x}$

$$\dfrac{3 \cdot 2 \cdot x \cdot (7 - x^2)}{3 \cdot 2 \cdot 3 \cdot 2 \cdot x}$$

$$\boxed{\dfrac{7 - x^2}{6}}$$

15.) $\dfrac{x^2 + x - 20}{x^2 + 2x - 15}$ $1 \cdot -20 = -20$

$5 + -4 = 1$

$\dfrac{x^2 + 5x | -4x - 20}{x(x+5) - 4(x+5)}$

$\dfrac{(x+5)(x-4)}{x^2 + 5x | -3x - 15}$ $1 \cdot -15 = -15$

$5 + -3 = 2$

$x(x+5) - 3(x+5)$

$(x+5)(x-3)$

$\dfrac{(x+5)(x-4)}{(x+5)(x-3)}$ $\boxed{\dfrac{x-4}{x-3}}$

16.) $\dfrac{x^2 - 16}{x - 4}$

$\dfrac{(x+4)(x-4)}{x-4}$

$\boxed{x+4}$

17.) $\dfrac{x^2 - 4x + 3}{x + 1}$ $1 \cdot 3 = 3$

$-3 + -1 = -4$

$\dfrac{x^2 - 3x | -1x + 3}{x(x-3) - 1(x-3)}$

$(x-3)(x-1)$

$\boxed{\dfrac{(x-3)(x-1)}{x+1}}$

18.) $\dfrac{x^2 + 9x + 14}{x^2 - 49}$ $1 \cdot 4 = 14$

$7 + 2 = 9$

$\dfrac{x^2 + 7x | + 2x + 14}{x(x+7) + 2(x+7)}$

$\dfrac{(x+7)(x+2)}{(x+7)(x-7)}$

$\boxed{\dfrac{x+2}{x-7}}$