EMA
Multiplying and Dividing Rational Expressions

Name: Key
Date: _____ Period: _____

Simplify each of the following by performing the indicated operation.

1.) $\frac{2a^2}{5b^2c} \cdot \frac{3bc^2}{8a^2} = \frac{3c}{20b}$

2.) $\frac{y^2}{x+2} \div \frac{y}{x+2}$

$= \frac{y^2}{x+2} \cdot \frac{x+2}{y} = y$

3). $\frac{x^{10}y^4}{33x^4} \div \frac{4y^{10}}{39x^5}$

$= \frac{x^{10}y^4}{33x^4} \cdot \frac{39x^5}{4y^{10}} = \frac{13x^{11}}{44y^6}$

4.) $\frac{c^2-3c}{c^2-25} \cdot \frac{c^2+4c-5}{c^2-4c+3}$

$= \frac{c(c-3)}{(c-5)(c+5)} \cdot \frac{(c+5)(c-1)}{(c-1)(c-3)} = \frac{c}{c-5}$

5.) $\frac{3x+6}{7x-7} \cdot \frac{14x-14}{2x-2}$

$= \frac{3(x+2)}{7(x-1)} \cdot \frac{14(x-1)}{2(x-1)} = \frac{3(x+2)}{x-1}$

6.) $\frac{3x^2-3}{2x^2+8x+6} \div \frac{5x^2-10x+5}{4x+12}$

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

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

$= \frac{6}{5(x-1)}$

7.) $\frac{\frac{8x^2-72}{5x+10}}{\frac{4x-12}{5x}} = \frac{\frac{8(x^2-9)}{5(x+2)}}{\frac{4(x-3)}{5x}}$

$= \frac{8(x-3)(x+3)}{5(x+2)} \cdot \frac{5x}{4(x-3)}$

$= \frac{x(x+3)}{x+2}$

8.) $\frac{\frac{5x^2-5x-30}{45-15x}}{\frac{6+x-x^2}{4x-12}} = \frac{\frac{5(x^2-x-6)}{-15(-3+x)}}{\frac{-1(x^2-x-6)}{4(x-3)}}$

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

$= \frac{4}{3}$

Simplify each of the following by performing the indicated operation.

9.) $\dfrac{x-3}{2x-8}\cdot\dfrac{6x^2-96}{x^2-9}$

$2(x-4)$ $\quad 6(x^2-16)$ $\quad (x-3)(x+3)$

$$=\frac{(x-3)}{2(x-4)}\cdot\frac{6(x-4)(x+4)}{(x-3)(x+3)}=\boxed{\frac{3(x+4)}{x+3}}$$

10.) $\dfrac{x^2+3x}{x^2+6x+8}\div\dfrac{4x^3+12x^2}{x^2+x-2}$

$x(x+3)$ $\quad 4x^2(x+3)$

$(x+2)(x+4)$ $\quad (x+2)(x-1)$

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

$$=\boxed{\frac{x-1}{x(x+4)}}$$

11.) $\dfrac{2a^2}{8ab^2}\cdot\dfrac{(a^2+4)(b-3)}{(a-2)(a^2+4)}$

$$=\boxed{\frac{a(b-3)}{4b^2(a-2)}}$$

12.) $\dfrac{x^2+3x-4}{x^2-4x+3}\cdot\dfrac{3-x}{x+4}$

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

$$=\boxed{-1}$$

13.) $\dfrac{6x-3}{2x+10}\cdot\dfrac{4(x-1)^2}{12x^2+6x-6}$

$3(2x-1)$ $\quad 4(x-1)(x-1)$

$2(x+5)$ $\quad 6(2x^2+x-1)$

$$=\frac{3(2x-1)}{2(x+5)}\cdot\frac{4(x-1)(x-1)}{6(2x-1)(x+1)}$$

$$=\boxed{\frac{(x-1)(x-1)}{(x+5)(x+1)}}$$

14.) $\dfrac{5x^2+10x-75}{4x^2-24x-28}\div\dfrac{x^2+7x+10}{2x^2-10x-28}$

$5(x^2+2x-15)$ $\quad (x+2)(x+5)$

$4(x^2-6x-7)$ $\quad 2(x^2-5x-14)$

$$=\frac{5(x+5)(x-3)}{4(x-7)(x+1)}\cdot\frac{2(x-7)(x+2)}{(x+2)(x+5)}$$

$$=\boxed{\frac{5(x-3)}{2(x+1)}}$$

15.) $\dfrac{\dfrac{x^2+8x+15}{x^2+2x-15}}{\dfrac{x^2+2-6}{x^2-2x-3}}$ $\quad \dfrac{(x+5)(x+3)}{(x^2-4)}$ $\quad \dfrac{(x+5)(x-3)}{(x-3)(x+1)}$

$$=\frac{(x+5)(x+3)}{(x-2)(x+2)}\cdot\frac{(x-3)(x+1)}{(x+5)(x-3)}$$

$$=\boxed{\frac{(x+3)(x+1)}{(x-2)(x+2)}}$$

16.) $\dfrac{\dfrac{x^2-100}{x^2}}{\dfrac{3x^2-31x+10}{2x}}$ $\quad \dfrac{(x-10)(x+10)}{x^2}$ $\quad \dfrac{(x-10)(3x-1)}{2x}$

$$=\frac{(x-10)(x+10)}{x^2}\cdot\frac{2x}{(x-10)(3x-1)}$$

$$=\boxed{\frac{2(x+10)}{x(3x-1)}}$$