Simplify $\dfrac{2m^3 - 4m^2}{3m^2 - 9m} \times \dfrac{m^2 - m - 6}{m^2 - 4}$. State the restrictions on the variable.

Class Ex. #5

Simplify $\left(\dfrac{a^2 + 8a + 15}{6a^2 + 21a + 9}\right)\left(\dfrac{a - 4a^3}{2a^2 + 9a - 5}\right)$. State the nonpermissible values.

Complete Assignment Questions #1 - #8

Assignment

1.   Simplify. State the restrictions on the variables.

a) $\dfrac{8a^2b^2c}{12abc^2} \times \dfrac{12a^2c}{6bc}$

b) $\dfrac{9x^4y^3}{12x^5} \times \dfrac{48x^2y^3}{14y} \times \dfrac{6x}{27y^4}$ $= \dfrac{2592\, x^7 y^6}{4536\, x^5 y^5}$

$= \dfrac{4}{7}x^2y$

2.   Simplify. State the restrictions on the variable.

a) $\dfrac{15a^2(a-1)}{8(2a+3)} \times \dfrac{10(2a+3)}{3d}$

$$\dfrac{25(a-1)}{4}, \; a \neq \dfrac{-3}{2}, 0$$

b) $\dfrac{7x(x+2)(x-3)}{21(x-7)(x+7)} \times \dfrac{(x+7)^2(x-7)}{2x(x-3)}$

$$\dfrac{7(x+2)(x+7)}{42} = \dfrac{(x+2)(x+7)}{6}, \; x \neq \pm 7, 0, 3$$

c) $\dfrac{6y-30}{(y-1)} \times \dfrac{5y-5}{3y^2-15y}$

$$\dfrac{6(y-5) \cdot 5(y-1)}{(y-1)(3y(y-5))}$$

$$\dfrac{30}{3y} = 10y, \; y \neq 0, 1, 5$$

d) $\dfrac{10x+2}{5x-1} \times \dfrac{x-1}{35x+7}$

$$\dfrac{2(5x+1)}{5x-1} \cdot \dfrac{x-1}{7(5x+1)}$$

$$\dfrac{2(x-1)}{5x-1}, \; x \neq \pm \dfrac{1}{5}$$

3.   Simplify. State the nonpermissible values.

a) $\dfrac{x^2-9}{6x+24} \times \dfrac{10x+40}{x(x+3)}$

$$\dfrac{(x-3)(x+3)}{6(x+4)} \cdot \dfrac{10(x+4)}{x(x+3)}$$

$$\dfrac{5(x-3)}{3}, \; x \neq -4, -3, 0$$

b) $\dfrac{4a^2-1}{4a^2-16} \times \dfrac{-(2-a)}{2a-1}$

$$\dfrac{4(a^2-4)}{}$$

$$\dfrac{(2a-1)(2a+1)(-1)(a-2)}{4(a-2)(a+1)(2a-1)}$$

$$\dfrac{-(2a+1)}{4(a+1)}, \; a \neq -1, 2, \dfrac{1}{2}.$$

c) $\dfrac{x^2+5x+6}{3x} \times \dfrac{6x}{x^2+9x+14}$

$$\dfrac{(x+2)(x+3)}{3x} \cdot \dfrac{6x}{(x+7)(x+2)}$$

$$2(x+3), \; x \neq 0, -7, -2$$

d) $\dfrac{2y^3-4y^2}{3y^2-9y} \times \dfrac{y^2-y-6}{y^2-4}$

$$\dfrac{2y^2(y-2)}{3y(y-3)} \cdot \dfrac{(y-3)(y-2)}{(y-2)(y+2)}$$

$$\dfrac{2y(y-2)}{3(y+2)}, \; y \neq 0, 3, \pm 2$$

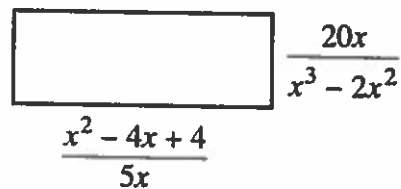**4.** Simplify. State the nonpermissible values.

a) $\left(\dfrac{x^2 - 3x + 2}{x^2 + 3x - 4}\right)\left(\dfrac{x^2 + 9x + 20}{x^2 + x - 6}\right)$

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

$\dfrac{x+5}{x+3}, \quad x \neq -4, -3, 1, 2$

b) $\dfrac{3(t^2+t-2)}{\left(\dfrac{3t^2 + 3t - 6}{2t^2 - 2t - 4}\right)} \cdot \dfrac{4(t^2+1t-6)}{\left(\dfrac{4t^2 + 4t - 24}{3t^2 + 6t - 9}\right)}$

$2(t^2-t-2) \quad 3(t^2+2t-3)$

$\dfrac{3(t+2)(t-1)\ 4(t+3)(t-2)}{2(t-2)(t+1)\ 3(t+3)(t-1)}$

$\dfrac{2(t+2)}{(t+1)}, \quad t \neq 2, \pm 1, -3$

c) $\dfrac{x^2 - 6x}{x^2 + 5x} \times \dfrac{x^2 + 7x + 10}{18 - 3x}$

$\dfrac{x(x-6)\ (x+5)(x+2)}{x(x+5)\ -3(x-6)}$

$\dfrac{(x+2)}{-3}, \quad x \neq 0, -5, 6$

d) $\dfrac{a^2 - 6a + 8}{2a^2 - 8a} \times \dfrac{a^2 - a}{8a^2 + 28} \times \dfrac{12a^2 + 42}{2a}$

$\dfrac{(a-4)(a-2)\ a(a-1)\ 6(2a+7)}{2a(a-4)\ 4(2a+7)\ 2a}$

$\dfrac{6\ (a-2)(a-1)}{16a} = \dfrac{3(a-2)(a-1)}{8a}, \quad a \neq 0, 4$

5. Consider the rectangle shown.

$\boxed{}$ $\dfrac{20x}{x^3 - 2x^2}$

$\dfrac{x^2 - 4x + 4}{5x}$

a) Write and simplify an expression for the area of the rectangle.

$A = lw$

$= \dfrac{20x}{x^3 - 2x^2} \cdot \dfrac{x^2 - 4x + 4}{5x}$

$= \dfrac{20x \cdot (x-2)(x-2)}{x^2(x-2)(5x)}$

$= \dfrac{4(x-2)}{x^2}$

b) Calculate the *exact* area if $x = 4\sqrt{5}$ cm.

$\dfrac{4(4\sqrt{5} - 2)}{(4\sqrt{5})^2}$

$= \dfrac{16\sqrt{5} - 8}{16(5)} = \dfrac{16\sqrt{5} - 8}{80}$

$= \dfrac{2\sqrt{5} - 1}{10}$

6. Simplify.

a) $\dfrac{2x^2 - 8y^2}{12x + 6y} \times \dfrac{18x^2 + 9xy}{6x + 12y}$

$\dfrac{2(x^2 - 4y^2)}{}$

$\dfrac{2(x-2y)(x+2y)\ 9x(2x+y)}{6(2x+y)6(x+2y)}$

$\dfrac{18x(x-2y)}{36}$

$= \dfrac{1x(x-2y)}{2}$

$x \neq , -\dfrac{y}{2}, \pm 2y$

b) $\dfrac{p^2 + 2pq - 15q^2}{3p^2 - 33pq + 84q^2} \times \dfrac{12q^2 + qp - p^2}{2p^2 + 16pq + 30q^2}$

$\dfrac{3(p^2 - 11pq + 28q^2)}{}$ $\dfrac{2(p^2 + 8pq + 15q^2)}{}$

$\dfrac{(p-3q)(p+5q)}{3(p-4q)(p-7q)} \dfrac{-1(p-4q)(p+3q)}{2(p+5q)(p+3q)}$

$\dfrac{-(p-3q)}{6(p-7q)}$ or $\dfrac{(-p+3q)}{6(p-7q)}$

or $\dfrac{(3q-p)}{6(p-7q)}$

$-p^2 + qp + 12q^2$
$-1(p^2 - qp - 12q^2)$
$-1(p-4q)(p+3q)$

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7. For all $x \neq 1, \pm\dfrac{7}{3}$, $\dfrac{(3x-7)^3}{3x^2 - 10x + 7} \times \dfrac{4 - 4x}{9x^2 - 49}$ reduces to

   A. -4

   B. $\dfrac{4(3x+7)}{3x-7}$

   C. $\dfrac{4(3x-7)}{(3x+7)}$

   D. $-\dfrac{4(3x-7)}{3x+7}$

$3x^2 - 10x + 7$

$\dfrac{(3x-7)(3x-7)(3x-7)\ 4(1-x)}{(x-1)(3x-7)\ (3x-7)(3x+7)} = \dfrac{-(-1+x)}{}$

$\begin{array}{c|cc} & 1x & -1 \\ \hline 3x & 3x & -3 \\ -7 & -7 & 7x \end{array}$

$\dfrac{-4(3x-7)}{3x+7}$

Numerical Response 8. For the appropriate restrictions, the product $\left(\dfrac{12x - 24}{3x^2 - 12}\right)\left(\dfrac{6x^2 + 30x + 36}{2x + 6}\right)$ reduces to

a whole number, k. The value of k is _____ $3(x^2 - 4)$

(Record your answer in the numerical response box from left to right.)

$$\frac{12(x-2)\ 6\ (x+2)(x+3)}{3(x-2)(x+2)\ 2(x+3)}$$

[1][2][ ][ ]

Answer Key

1. a) $\dfrac{4a^3}{3c}$, $a \neq 0, b \neq 0, c \neq 0$ b) $\dfrac{4x^2y}{7}$, $x \neq 0, y \neq 0$

2. a) $\dfrac{25a(a-1)}{4}$, $a \neq -\dfrac{3}{2}, 0$ b) $\dfrac{(x+2)(x+7)}{6}$, $x \neq 0, 3, \pm 7$

   c) $\dfrac{10}{y}$, $y \neq 0, 1, 5$ d) $\dfrac{2(x-1)}{7(5x-1)}$, $x \neq \pm\dfrac{1}{5}$

3. a) $\dfrac{5(x-3)}{3x}$, $x \neq -4, -3, 0$ b) $\dfrac{-2a-1}{4(a+2)}$, $a \neq \pm 2, \dfrac{1}{2}$

   c) $\dfrac{2(x+3)}{x+7}$, $x \neq -7, -2, 0$ d) $\dfrac{2y}{3}$, $y \neq \pm 2, 0, 3$

4. a) $\dfrac{x+5}{x+3}$, $x \neq -4, -3, 1, 2$ b) $\dfrac{2(t+2)}{t+1}$, $t \neq -3, \pm 1, 2$

   c) $\dfrac{-x-2}{3}$, $x \neq -5, 0, 6$ d) $\dfrac{3(a-1)(a-2)}{8a}$, $a \neq 0, 4$

5. a) $\dfrac{4(x-2)}{x^2}$ b) $\dfrac{2\sqrt{5}-1}{10}$ cm^2

6. a) $\dfrac{x(x-2y)}{2}$, $x \neq -\dfrac{1}{2}y, -2y$ b) $\dfrac{3q-p}{6(p-7q)}$, $p \neq -5q, -3q, 4q, 7q$

7. D   8. [1][2][ ][ ]