Sec. 8.4 Rational Expressions

Write in simplest form: FACTOR & CANCEL

a. $\frac{9x^2+6x}{36x+24} = \frac{3x(3x+2)}{12(3x+2)} \neq 0 \quad -2 \quad -2 \quad \frac{3x}{3} = \frac{-2}{3} = \frac{x}{4}, x \neq -\frac{2}{3}$

b. $\frac{1x^2-3x+2}{x+2} \cdot \frac{x^2-36}{x^2+5x-6}$ $1 \cdot 2$ $-1 \cdot 6$ $2 \cdot 3$

$\frac{(x-1)(x-2)(x+6)(x-6)}{(x+2)(x-1)(x+6)} \neq 0$

$x^2-1x-2x+2$

$x(x-1)-2(x-1)$

$(x-1)(x-2)$

$x+2 \neq 0$, $x \neq -2$

$x-1 \neq 0$, $x \neq 1$

$x+6 \neq 0$, $x \neq -6$

$= \frac{(x-2)(x-6)}{(x+2)}, x \neq -2, 1, -6$

c. $\frac{6x-3x^2}{36-x^2} \div \frac{x^3-x^2-2x}{x^2-5x-6}$

$\frac{6x-3x^2}{36-x^2} \cdot \frac{x^2-5x-6}{x^3-x^2-2x}$ $1 \cdot 6$ $2 \cdot 3$

$x^2+1x-6x-6$

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

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

$\frac{3x(2-x)(x+1)(x-6)}{(6-x)(6+x)x(x+1)(x-2)} \neq 0$

$x(x^2-x-2)$

$x[x^2+1x-2x-2$

$x[x(x+1)-2(x+1)$

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

$= \frac{3}{x+6}, x \neq -6, -1, 0, 2, 6$

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

$6-x=0$, $x \neq 6$ ✓

$6+x=0$, $x \neq -6$ ✓

$x=0$, $x \neq 0$ ✓

$x+1=0$, $x \neq -1$ ✓

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d. $\dfrac{3a^3b^3}{\dfrac{a-b}{\dfrac{4ab}{b-a}}} = \dfrac{3a^3b^3}{a-b} \div \dfrac{4ab}{b-a}$

$= \dfrac{3a^3b^3}{a-b} \cdot \dfrac{(b-a)^{-1}}{4ab}$

$= -\dfrac{3a^2b^2}{4}, \quad a \neq 0,\ b \neq 0,\ a \neq b$

$a - b = 0$

$4 = 0$

$a = 0$

$b = 0$

$a - b = 0$

$+b \quad +b$

$a \neq b$

$b - a = 0$

$+a \quad +a$

$b \neq a$

e. Which jewelry box uses the least amount of material for the bottom and for the lid if the perimeters of the boxes are the same:

a jewelry box shaped like a circle or
a jewelry box shaped like a regular hexagon?

Circle. Reg. Hexagon (6)