

# Chapter 8 Review

Key

1. Simplify. Under what conditions is the expression undefined?

a)  $\frac{3x+6}{x^2+3x+2}$   
 $(x+2)(x+1)$

$x \neq -2, -1$

b)  $\frac{3(2x^2-9x-5)}{6x^2-27x-15}$   
 $\frac{2x^2+5x+2}{(2x+1)(x+2)}$

$x \neq -\frac{1}{2}, -2$

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

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

2. Simplify each expression.

a)  $\frac{5x^2}{12y} \cdot \frac{3y^2}{10x^3}$   
 $\frac{4y^2}{2x^3}$

$\frac{3}{8x^3y^2}$

b)  $\frac{7x^2y}{6a^3b^2} \div \frac{14xy^5}{9ab^4}$

$\frac{7x^2y}{6a^3b^2} \cdot \frac{9ab^4}{14xy^5}$   
 $\frac{3xb^2}{4a^2y^4}$

c)  $\frac{3(x+3)}{x^2-6x+8} \cdot \frac{(x+2)(x-2)}{x^2+2x-3}$   
 $\frac{(x-4)(x-2)}{(x+3)(x-1)}$

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

d)  $\frac{x-3}{x+1} \div \frac{x^2+2x-15}{4x+4}$

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

e)  $\frac{2x-4}{x+6} \cdot \frac{x+6}{x^2-5x+6}$   
 $\frac{x^2+x-30}{x^2+x-30}$

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

3. Simplify each expression.

a)  $\frac{7a^2b \cdot 5a^2}{7a^2b \cdot 6b} + \frac{9 \cdot 3}{14a^2b^2 \cdot 3}$   
 LCD =  $42a^2b^2$

$\frac{35a^4b + 27}{42a^2b^2}$

b)  $\frac{3x}{2y} + 4 \frac{8y}{2y}$

$\frac{3x+8y}{2y}$

$$c) \frac{x+10}{3x-15} - \frac{3x+15}{6x-30}$$

$2 \cdot 3(x-5) \quad 6(x-5)$

$$\frac{2x+20-3x-15}{6(x-5)} = \frac{-1x+5}{6(x-5)} = \frac{-1(x-5)}{6(x-5)} = \boxed{\frac{-1}{6}}$$

$$d) \frac{16}{x^2-16} - \frac{2}{x+4} \cdot \frac{(x-4)}{(x-4)}$$

$(x+4)(x-4)$

$$\frac{16-2x+8}{(x+4)(x-4)} = \boxed{\frac{-2x+24}{(x+4)(x-4)}}$$

6. Solve for x.

$$a) \frac{(x-5)3x-1}{(x-5)x+5} + \frac{32}{x^2-25} = \frac{3x+1 \cdot (x+5)}{x-5 \cdot (x+5)}$$

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

$$3x^2 - 16x + 5 + 32 = 3x^2 + 16x + 5$$

$$-32x = -32$$

$$\boxed{x=1} \checkmark$$

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

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

$$4x^2 - 8x - 5x^2 + 5x = 2$$

$$-1x^2 - 3x - 2 = 0$$

$$x^2 + 3x + 2 = 0$$

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

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

$$e) \frac{-1 \cdot 1}{-1 \cdot 1-x} = 1 - \frac{x}{(x-1) \cdot -1}$$

$1-x$

$$-1 = -1(1-x) - x$$

$$-1 = -1 + x - x$$

$$-1 = -1$$

all real numbers  
(except  $x \neq 1$ )

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

$$x(x-1) + 2x = 3-x$$

$$x^2 - x + 2x = 3 - x$$

$$x^2 + 2x - 3 = 0$$

$$(x+3)(x-1) = 0$$

$$\boxed{x = -3, 1}$$

$$d) \frac{-4}{x-2} = \frac{x}{-2} \quad \# \text{ cross multiply}$$

$$8 = x(x-2)$$

$$8 = x^2 - 2x$$

$$0 = x^2 - 2x - 8$$

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

$$\boxed{x = 4, -2}$$