

## Section 6.7 - Solving Quadratics by Factoring

$$\text{Ex) } (4x-1)(x+6)=0$$

Defn: A quadratic equation has the form  
$$ax^2+bx+c=0 \quad a \neq 0$$

Defn: The zero property states that if  $a$  and  $b$  are expressions (or numbers), and  $a \cdot b = 0$ , then  $a = 0$  or  $b = 0$

$$\text{Ex) } (x-12)(5x+6)=0$$

$$x^2-2x-63=0$$

$$x^2+5x+6=0$$

$$\text{Ex) } x^2-25=0$$

$$x^2-49=0$$

$$\text{Ex) } 6x^2=12x$$

$$5x^2=25x$$

$$\text{Ex) } 2x^2-2=-3x \quad (-2, \frac{1}{2})$$

$$3x^2-8=-10x \quad (\frac{2}{3}, -4)$$

$$\text{Ex) } x(9x-12)=-4$$

$$x(4x+12)=-9$$

$$\text{Ex) } 6x^3+12x=17x^2$$

$$10x^3+\cancel{10}x^2=2x$$

### Practice

$$\textcircled{1} 4a^2+1=8a+1$$

$$\textcircled{2} x^3-6x^2=9x$$

$$\textcircled{3} 5f(5f-16)=-15$$

## Section 6.8 - Applications of Quadratics

Ex) p. 490, Ex 1

p. 491, Ex 2

p. 493, Ex 4

p. 494, Ex 5

## Section 7.1 - Simplifying Rational Expressions

A rational expression is of the form  $\frac{A}{B}$  where  
A and B are ~~polynomials~~ polynomials and  $B \neq 0$ .

Ex) Evaluate  $\frac{2x-1}{x^2+1}$  for  $x = -3$   
 $x = 0$

Find where the expressions are undefined.

a)  $\frac{7x}{x-5}$     b)  $\frac{3x-2}{x^2-x-6}$     c)  $\frac{8}{x^2+1}$     d)  $\frac{x+5}{12}$

Rule:  $\frac{AC}{BC} = \frac{A}{B}$   $B, C \neq 0$

Simplify:

Ex)  $\frac{21x^3}{14x^2}$

Ex)  $\frac{30t-6}{36}$

Ex)  $\frac{x^2+13x+12}{x^2+12x}$

Ex)  $\frac{x^3+x^2}{x+1}$

Simplify

$$\text{Ex)} \frac{4t-20}{12}$$

$$\text{Ex)} \frac{x^2-6-x}{x^2-3x}$$

$$\text{Ex)} \frac{2x^4+4x^3}{x+2}$$

Simplify

$$\text{Ex)} \frac{3x^2-8x-3}{2x^5-18x^3}$$

$$\text{Ex)} \frac{(x-y)^4}{x^2-2xy+y^2}$$

$$\text{Ex)} \frac{4x^2-4x-15}{8x^3-50x}$$

$$\text{Ex)} \frac{(a+3b)^5}{a^2+6ab+9b^2}$$

Simplify

$$\text{Ex)} \frac{5(x+3)-5}{7(x+3)-7}$$

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

$$\text{Ex)} \frac{2a-1}{1-2a}$$

$$\text{Ex)} \frac{3p-2}{2-3p}$$

$$\text{Ex)} \frac{y^2-1}{3-3y}$$

$$\text{Ex)} \frac{t+8}{t-8}$$

## Section 7.2 - Multiplying/Dividing Rational Exp.

Rule:  $\frac{A}{B} \cdot \frac{C}{D} = \frac{AC}{BD}$       Rule:  $\frac{A}{B} \div \frac{C}{D} = \frac{A}{B} \cdot \frac{D}{C} = \frac{AD}{BC}$

or  $\frac{\frac{A}{B}}{\frac{C}{D}} = \frac{A}{B} \cdot \frac{D}{C} = \frac{AD}{BC}$

Ex)  $\frac{x+1}{x} \cdot \frac{9}{4x^2}$

$\frac{35x^3}{17y} \cdot \frac{y}{5x}$

Ex)  $\frac{x+3}{2x+4} \cdot \frac{6}{x^2-9}$

$\frac{8x^2-8x}{x^2+x-56} \cdot \frac{3x^2-22x+7}{x-x^2}$

Ex)  $\frac{3n-9}{3n+2} \cdot \frac{9n^2-4}{6}$

$\frac{m^2-4m-5}{2m-m^2} \cdot \frac{2m^2-4m}{3m^2-14m-5}$

Ex)  $63x \left( \frac{1}{7x} \right)$

Ex)  $5a \left( \frac{3a-1}{a} \right)$

### Division

Ex)  $\frac{a}{13} \div \frac{17}{26}$

Ex)  $\frac{9x}{35y} \div \frac{15x^2}{14}$

$$\text{Ex)} \quad \frac{8a}{3b} \div \frac{16a^2}{9b^2}$$

$$\text{Ex)} \quad \frac{x^2+x}{3x-15} \div \frac{(x+1)^2}{6x-30} \quad \text{Ex)} \quad \frac{z^2-9}{z^2+4z+3} \div \frac{z^2-3z}{(z+1)^2}$$

$$\text{Ex)} \quad \frac{2x^2-3xy-2y^2}{2x+y} \div (4y^2-x^2)$$

$$\text{Ex)} \quad (b-a) \div \frac{a^2-b^2}{a^2+ab}$$

Ex 1) A roll of carpet is 12 ft wide, 150 ft long  
Find # of sq. yd. of carpeting

Conversion:  $1 \text{ yd}^2 = 9 \text{ ft}^2$

$$\frac{1800 \text{ ft}^2}{1 \text{ roll}} = \frac{1800 \text{ ft}^2}{1 \text{ roll}} \cdot \frac{1 \text{ yd}}{9 \text{ ft}^2} = \frac{200 \text{ yd}^2}{1 \text{ roll}}$$

Ex 2) Convert speed of light  $186,000 \frac{\text{mi}}{\text{s}}$  to  $\frac{\text{mi}}{\text{min}}$

$$\frac{186,000 \text{ mi}}{1 \text{ s}} \cdot \frac{60 \text{ s}}{1 \text{ min}} = \frac{11,160,000 \text{ mi}}{1 \text{ min}}$$

