

# Homework Qs

Note Title

3/29/2017

## Problem Recognition Exercises (pp 470-471)

#23)  $x^3 + 0.001$

$$x^3 + \frac{1}{1000}$$

$$(x)^3 + \left(\frac{1}{10}\right)^3$$

Ex:  $\frac{1}{4}x^2 - \frac{1}{9}$

$$\left(\frac{1}{2}x\right)^2 - \left(\frac{1}{3}\right)^2$$

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

$$\frac{1}{10} = 0.1$$

$$\frac{1}{10^2} = \frac{1}{100} = 0.01$$

$$\frac{1}{10^3} = \frac{1}{1000} = 0.001$$

$$\frac{1}{10^4} = \frac{1}{10000} = 0.0001$$

Note:  $10^2 = 100$

$$10^3 = 1000$$

$$10^4 = 10000$$

$$\left(x + \frac{1}{10}\right)\left(x^2 - x\left(\frac{1}{10}\right) + \left(\frac{1}{10}\right)^2\right)$$

$$\left(x + \frac{1}{10}\right)\left(x^2 - \frac{1}{10}x + \frac{1}{100}\right)$$

## 6.7: Solving quadratic equations (cont'd)

1)  $w^2 = 10w - 16$

2)  $4y^2 = 81$

Solve the equations.

3)  $6x^2 - 32x + 30 = 9 - 7x$

4)  $x^2 = 6x$

5)  $7 - 7x = (3x + 2)(x - 1)$

6)  $80 = 5x^2$

#1)  $w^2 = 10w - 16$   
 $+16 \quad -10w \quad +16$   
 $-10w$

$$w^2 - 10w + 16 = 0$$

$$(w - 8)(w - 2) = 0$$

$$w - 8 = 0 \quad \text{or} \quad w - 2 = 0$$

$$w = 8 \quad \text{or} \quad w = 2$$

Sol'n Set:

$$\{8, 2\}$$

$$\#2) 4y^2 = 81$$

$$4y^2 - 81 = 0$$

$$(2y+9)(2y-9)=0$$

$$2y+9=0 \quad \text{or} \quad 2y-9=0$$

$$2y = -9$$

$$2y = 9$$

$$\frac{2y}{2} = \frac{-9}{2}$$

$$\frac{2y}{2} = \frac{9}{2}$$

$$y = -\frac{9}{2}, \quad y = \frac{9}{2}$$

Sol'n Set:

$$\left\{ -\frac{9}{2}, \frac{9}{2} \right\}$$

Official shorthand for this:

$$\left\{ \pm \frac{9}{2} \right\}$$

read "plus or minus  $\frac{9}{2}$ "

$$3) 6x^2 - 32x + 30 = 9 - 7x$$

$$6x^2 - 25x + 21 = 0$$

$$(6x - 7)(x - 3) = 0$$

$$6x - 7 = 0 \quad \text{or} \quad x - 3 = 0$$

$$6x = 7$$

$$x = 3$$

$$\frac{6x}{6} = \frac{7}{6}$$

$$x = \frac{7}{6}$$

Sol'n Set:

$$\left\{ \frac{7}{6}, 3 \right\}$$

$$4) x^2 = 6x$$

$$x^2 - 6x = 0$$

$$x(x-6) = 0$$

$$x=0 \quad \text{or} \quad x-6=0$$

$$x=6$$

$$\text{Sol'n Set: } \boxed{\{0, 6\}}$$

$$5) 1-7x = (3x+2)(x-1)$$

$$1-7x = 3x^2 - 3x + 2x - 2$$

$$1-7x = 3x^2 - x - 2$$

$$-3x^2 + x + 2 + 1 - 7x = 0$$

$$-3x^2 - 6x + 3 = 0$$

$$-3(x^2 + 2x - 1) = 0$$

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

$$-3=0 \quad \text{or} \quad x+3=0 \quad \text{or} \quad x-1=0$$

$$\text{never true} \quad x=-3 \quad x=1$$

Sol'n Set

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

$$6) 80 = 5x^2$$

$$0 = 5x^2 - 80$$

$$0 = 5(x^2 - 16)$$

$$0 = 5(x+4)(x-4)$$

$$5=0 \quad \text{or} \quad x+4=0 \quad \text{or} \quad x-4=0$$

$$\text{never true} \quad x=-4 \quad x=4$$

$$\boxed{\{-4, 4\}}$$

$$\text{or } \boxed{\{\pm 4\}}$$

or

$$1-7x = 3x^2 - x - 2$$

$$0 = 3x^2 - x - 2 - 1 + 7x$$

$$0 = 3x^2 + 6x - 3$$

$$0 = 3(x^2 + 2x - 1)$$

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

$$3=0 \quad | \quad x+3=0 \quad | \quad x-1=0$$

$$\text{never true} \quad x=-3 \quad x=1$$

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

Ex.

$$2x^3 - 8x = 0$$

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

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

$$2x=0 \quad \text{or} \quad x+2=0 \quad \text{or} \quad x-2=0$$

$$\frac{2x}{2} = \frac{0}{2} \quad | \quad x=-2 \quad | \quad x=2$$

$$x=0$$

$$\boxed{\{0, 2, -2\}} \quad \text{or} \quad \{0, \pm 2\}$$

A couple more problems: (did these in 7:30 mw class)

Ex:  $x^2 = 9$

$$x^2 - 9 = 0$$

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

$$x+3=0 \quad \text{or} \quad x-3=0$$

$$x = -3 \quad | \quad x = 3$$

Sol'n Set:

$$\{3, -3\}$$

or

$$\{\pm 3\}$$

$$7) 3y^3 - 6y^2 = 24y$$

$$3y^3 - 6y^2 - 24y = 0$$

$$3y(y^2 - 2y - 8) = 0$$

$$3y(y-4)(y+2) = 0$$

$$3y = 0$$

or

$$y - 4 = 0$$

or

$$y + 2 = 0$$

$$\frac{3y}{3} = \frac{0}{3}$$

$$y = 0$$

$$\{0, 4, -2\}$$

## 6.8: Applications of Quadratic Equations

Ex: The length of a rectangle is 6" more than four times its width. The area of the rectangle is 70 square inches. Find the length and width.

length:  $4x + 6$   
width:  $x$

length  $\xrightarrow[\text{to}]{\text{compare}}$  width X

$$\text{Area of a rectangle} = (\text{length})(\text{width})$$

Or alternatively, area = (base)(height)

$$A = (\text{length})(\text{width})$$

$$70 = (4x + 6)(x)$$

Can rearrange:

$$x(4x + 6) = 70$$

$$4x^2 + 6x = 70$$

-70      -70

$$4x^2 + 6x - 70 = 0$$

$$2(2x^2 + 3x - 35) = 0$$

$$2(2x - 7)(x + 5) = 0$$

$2 = 0$   
never true

or

$$2x - 7 = 0$$

$$2x = 7$$

$$\frac{2x}{2} = \frac{7}{2}$$

$$x = \frac{7}{2}$$

or

$$x + 5 = 0$$

$$x = -5$$

Negative does not make sense for a dimension

Throw out  $-5$

width:  $x = \frac{7}{2} = 3\frac{1}{2}$

length:  $4x + 6$

signs opposite  
want a difference of  $3x$

$$\begin{array}{cc} 2x^2 & 35 \\ \uparrow & \uparrow \\ 2x \cdot x & 7 \cdot 5 \\ \text{---} 7x & \text{---} 10x \end{array}$$

$$x = \frac{7}{2} \Rightarrow \underline{4} \left( \frac{7}{2} \right) + 6$$

$$\frac{28}{2} + 6$$

$$14 + 6$$

$$= 20$$

The length is 20"  
and the width is  
 $3\frac{1}{2}$ "