Warm - Up

Factor each of the following...

1. $1x^2 - 10x - 24$

$(x-12)(x+2)$

2. $3x^2 - 12x - 36$

$3(x^2-4x-12)$

$3(x-6)(x+2)$

3. $4x^2 - 16x + 15$

$4x^2-10x-6x+15$

$2x(2x-5)-3(2x-5)$

$(2x-5)(2x-3)$

4. $6x^2 - x - 15$

$6x^2-10x+9x-15$

$2x(3x-5)+3(3x-5)$

$(3x-5)(2x+3)$

5. $x^2 - 25$

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

Perfect Square Trinomial

6. $81x^2 - 72x + 16$

$9x \quad (9x)(4)x^2 \quad 4$

$= (9x-4)^2$

$(9x-4)(9x-4)$

Solving Quadratic Equations by Factoring

To solve a quadratic equation, you could graph the corresponding quadratic function OR use the following principle:

If ab = 0, then a= 0 or b = 0

Example 1,

a)Solve $x^2 - 4x + 3 = 0$

$x^2 - 4x + 3 = 0$ Simple Trinomial Factor by Inspection

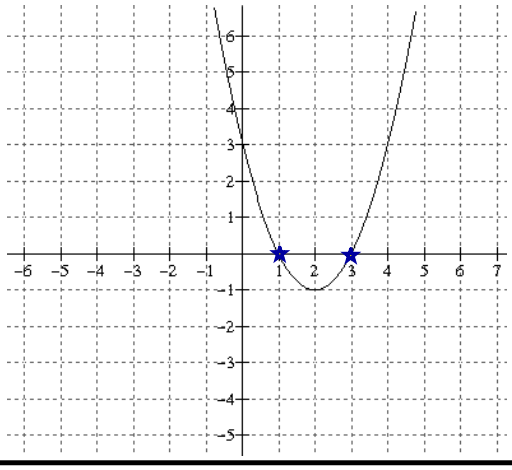
$(x - 1)(x - 3) = 0$

$x-1=0$ **OR** $x-3=0$

$x=1$ $x=3$

The roots are 1 and 3

b) Graph $y = x^2 - 4x + 3$



The x-intercepts of the graph are the same as the roots of the equation.

To solve a quadratic equation, the trinomial expression must be **equated to zero!!!**

Different Ways of Expressing.....

What are the roots of...

Determine the zeroes of...

Solve....

Find the solution set of....

$\{x \mid x \geq -3, x \in R\}$

Find the x-intercepts of....

POWERPOINT Examples…

Solve by factoring #1

Solve by factoring #2

Another Example...

Solving Equations by Factoring:

Solve: $x^2 - 10 = 3x$

1. Get one side = 0 $x^2 - 3x - 10 = 0$
2. Factor completely $(x - 5)(x + 2) = 0$
3. Set each factor = 0 $x - 5 = 0$ *OR* $x + 2 = 0$
4. Solve each equation $x = 5$ *OR* $x = -2$
5. Check in original $(5)^2 - 10 = 3(5)?$ $(-2)^2 - 10 = 3(-2)?$
   $25 - 10 = 15$ *YES* $4 - 10 = -6$ *YES*
6. Solution set $\{5, -2\}$

EXAMPLE #2: Determine the zeroes of the following...

Let $y = 0$

$$y = 5x^2 - 17x + 6$$

$$0 = 5x^2 - 15x - 2x + 6$$

$$0 = 5x(x-3) - 2(x-3)$$

$$0 = (x-3)(5x-2)$$

$\therefore$ $x - 3 = 0$ OR $5x - 2 = 0$

$x = 3$ $\quad$ $5x = 2$

$x = \frac{2}{5}$

Creating a Quadratic Equation given Two Roots (x-int)

EXAMPLE #3:

Create a quadratic equation that has the following roots...

a) -7 & 4

$x=-7$ OR $x=4$

$x+7=0$ $\quad x-4=0$

$(x+7)(x-4)=0$

$x^2+3x-28=0$

b) -5/2 & 2/3

$x=-\frac{5}{2}$ OR $x=\frac{2}{3}$

$x+\frac{5}{2}=0$ $\quad x-\frac{2}{3}=0$

$\left(x+\frac{5}{2}\right)\left(x-\frac{2}{3}\right)=0$

$\times 6$

$\left(x^2-\frac{2}{3}x+\frac{5}{2}x-\frac{5}{3}=0\right)$

$6x^2-4x+15x-10=0$

$6x^2+11x-10=0$

$x^2+\frac{11}{6}x-\frac{5}{3}=0$

More efficient ...

$x=-\frac{5}{2}$ $\quad x=\frac{2}{3}$

$2x=-5$ $\quad 3x=2$

$2x+5=0$ $\quad 3x-2=0$

$(2x+5)(3x-2)=0$

$6x^2+11x-10=0$

3. $h = 2 + 6t - 2t^2$

$h = -2\left(t - \frac{3}{2}\right)^2 + \frac{13}{2}$

$V\left(\frac{3}{2}, \frac{13}{2}\right)$

(t, h)

1.5 sec to Reach Max

9. Profit = (# of stocks sold)(Selling Price) − (Purchase Price)(# of stocks sold)

Let x Rep. # of $1 increases

$P = (6000 - 200x)(44 + 1x) - (25)(6000 - 200x)$

$\vdots$

$\downarrow$

$P = -200\left(x - \frac{11}{2}\right) + 112050$

$\left(\frac{11}{2}, 112.050\right)$

(x, P)

5.5

Selling Price $= 44 + 5.5(1)$

$= \$49.50$

Homework...

page 44 & 45: **#4 (1st column)**
#5
#8
#9 (1st column)
#12

Quiz Wednesday:
① → finding equation of a quadratic
② Max./Min Applications

SOLUTIONS...

#4. a) $(x + 5)(x + 1)$
b) $(3x + 1)(x + 2)$
c) $(3p + 4)(p - 5)$
d) $(x - 2)(x + 8)$
e) $(3x - 1)(2x + 1)$
f) $(3m - 1)(m - 3)$
g) $(m + 16)(m + 1)$
h) $(4a - 1)(a - 9)$

#5. a) 2.45 s; reaching a max height of just over 6 m.
b) 4.9 s

#8. a) -5 and 3
b) -4 and 4
c) -4
d) -1 and -1/3
e) 1.268 and 4.732

#9. a) -3 and 2
b) -1 and 2
c) -1/2 and 3
d) 3.5
e) 1/3 and 1/2
f) -2 and 0
g) -4 and 4
h) -1/3

#12. a) any function of the form $y = a(x + 3)^2$
b) any function of the form $y = ax^2 - 4a$
c) any function of the form $y = a(x^2 + 7/2x + 3/2)$
d) any function of the form $y = a(x^2 - 15x + 50)$
e) any function of the form $y = a(x^2 - 2)$

Attachments

Quadratic Equation started.ppt

Solve equations by factoring april 2005.ppt