

HW #10 - due Fri, 10/2

5.7 #35-75odd Solving equations by factoring



5.7 Solving Equations by Factoring

Zero Product Property:If $AB=0$, then $A=0$ or $B=0$

Example:

$$(x+2)(x-5)(3x+4)=0$$

Set each factor = 0 and solve for x.

$$x+2=0$$

$$x = -2$$

$$x-5=0$$

$$x = 5$$

$$3x+4=0$$

$$3x = -4$$

$$x = -4/3$$

$$\left\{ -2, -\frac{4}{3}, 5 \right\}$$

Example of what **not** to do:

$$(x-3)(x+4)(x-2)=5$$

$$x-3 \neq 5!$$

5.7

$$14. \quad x^2 + x - 6 = 0$$

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

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

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

$$20. \quad 2y^2 - 10y = 0$$

$$2y(y-5) = 0$$

$$2y = 0 \quad y-5 = 0$$

$$y = 0, \quad y = 5$$

$$26. \quad 4y^2 - 19y = 5$$

$$4y^2 - 19y - 5 = 0$$

$$\underline{4y^2 - 20y} + \underline{1y - 5} = 0$$

$$4y(y-5) + 1(y-5) = 0$$

$$(y-5)(4y+1) = 0$$

$$y-5=0$$

$$\boxed{y=5}$$

$$4y+1=0$$

$$4y=-1$$

$$\boxed{y=-\frac{1}{4}}$$

$$40. \quad (x+2)(x-6) = 20$$

$$(x+2)(x-6) - 20 = 0$$

$$x^2 - 6x + 2x - 12 - 20 = 0$$

$$x^2 - 4x - 32 = 0$$

$$(x-8)(x+4) = 0$$

$$x-8=0, \quad x+4=0$$

$$\boxed{x=8, \quad x=-4}$$

$$48. \quad 2x^3 + x^2 - 8x - 4 = 0$$

$$x^2(2x+1) - 4(2x+1) = 0$$

$$(2x+1)(x^2-4) = 0$$

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

$$2x+1=0 \quad x+2=0 \quad x-2=0$$

$$2x=-1 \quad x=-2 \quad x=2$$

$$x=-\frac{1}{2} \quad x=-2 \quad x=2$$

$$32. \quad t(t+1) = 42$$

$$t^2 + t = 42$$

$$t^2 + t - 42 = 0$$

$$(t+7)(t-6) = 0$$

$$t+7=0, t-6=0$$

$$t = -7, 6$$

$$46. \quad (2-b)^2 + b^2 = 10$$

$$4 - 4b + b^2 + b^2 = 10$$

$$4 - 4b + 2b^2 - 10 = 0$$

$$2b^2 - 4b - 6 = 0$$

$$2(b^2 - 2b - 3) = 0$$

$$2(b-3)(b+1) = 0$$

$$b-3=0, b+1=0$$

$$b = 3, -1$$

$$42. \quad (a-9)(a-1) = -7$$

$$a^2 - a - 9a + 9 = -7$$

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

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

$$a-8=0, a-2=0$$

$$a = 8, 2$$

$$50. \quad 12x^3 - 8x^2 - 3x + 2 = 0$$

$$4x^2(3x-2) - 1(3x-2) = 0$$

$$(4x^2-1)(3x-2) = 0$$

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

$$2x-1=0, 2x+1=0, 3x-2=0$$

$$x = \frac{1}{2}, -\frac{1}{2}, \frac{2}{3}$$

52. $f(x) = x^2 + 4x - 2$; $f(c) = 3$

Find all values of c for which $f(c) = 3$.

$$f(c) = c^2 + 4c - 2$$

$$c^2 + 4c - 2 = 3$$

$$c^2 + 4c - 5 = 0$$

$$(c+5)(c-1) = 0$$

$$c+5 = 0, c-1 = 0$$

$$c = -5, 1$$

58. $f(x) = x^3 + 3x^2 - 4x - 11$; $f(c) = 1$

$$x^3 + 3x^2 - 4x - 11 = 1$$

$$x^3 + 3x^2 - 4x - 12 = 0$$

$$x^2(x+3) - 4(x+3) = 0$$

$$(x+3)(x^2-4) = 0$$

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

$$x = -3, 2, -2$$

$$64. \quad x^3 + 7x = 8x^2$$

$$x^3 - 8x^2 + 7x = 0$$

$$x(x^2 - 8x + 7) = 0$$

$$x(x-7)(x-1) = 0 \Leftrightarrow (x-0)(x-7)(x-1) = 0$$

$$\boxed{x = 0, 7, 1}$$

72. height of a Δ is 4cm more than twice the length of base.
Area of Δ is 35 cm^2 . Find height.

l = length of base

$$\text{height} = 4 + 2l$$

$$\text{Area of } \Delta = \frac{1}{2}(\text{length of base})(\text{height})$$

$$35 = \left[\frac{1}{2}(l) \right] (4 + 2l)$$

$$35 = 2l + l^2$$

$$0 = l^2 + 2l - 35$$

$$0 = (l+7)(l-5)$$

$$\cancel{l = -7} \quad l = 5$$

height

$$4 + 2l$$

$$= 4 + 2(5)$$

$$= 4 + 10$$

$$= \boxed{14}$$

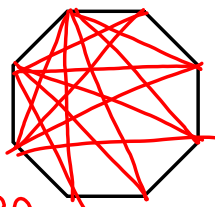
$$\begin{aligned}60. \quad & x + x^2 = 132 \\ & x^2 + x - 132 = 0 \\ & (x+12)(x-11) = 0 \\ & x = -12, 11\end{aligned}$$

$$\begin{aligned}64. \quad & x^3 + 7x = 8x^2 \\ & x^3 - 8x^2 + 7x = 0 \\ & x(x^2 - 8x + 7) = 0 \\ & x(x-7)(x-1) = 0 \\ & x = 0, 7, 1\end{aligned}$$

$$68. D = \frac{n(n-3)}{2}$$

D = # of diagonals

n = # of sides of a polygon



$$54 = \frac{n(n-3)}{2}$$

$$108 = n^2 - 3n$$

$$0 = n^2 - 3n - 108$$

$$0 = (n-12)(n+9)$$

$$\boxed{n=12}, \text{ } \cancel{9}$$