

# Bellwork:

simplify:  $(x-5)(x^2 - 5x + 7)$

$$\begin{array}{r}
 \textcircled{\times} \quad \quad \quad x - 5 \\
 \hline
 -5x^2 \quad +25x \quad -35 \\
 \\
 x^3 \quad -5x^2 \quad +7x \quad 0 \\
 \hline
 x^3 \quad -10x^2 \quad +32x \quad -35
 \end{array}$$


## Chapter 5.4: Factor and Solve Polynomial Equations

Recall:

- Set equal to zero
- Factor, Factor, Factor
- Set factors equal to zero
- Solve

Ex. Factor:

$$\begin{array}{l}
 x^3 + 2x^2 - 15x \\
 x(x^2 + 2x - 15) \\
 x(x+5)(x-3)
 \end{array}
 \qquad
 \begin{array}{l}
 2y^5 - 18y^3 \\
 2y^3(y^2 - 9) \\
 2y^3(y+3)(y-3)
 \end{array}$$

$$\begin{array}{l}
 4z^4 - 16z^3 + 16z^2 \\
 4z^2(z^2 - 4z + 4) \\
 4z^2(z-2)(z-2)
 \end{array}$$


Special Patterns:

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

$$a^2 - b^2 = (a + b)(a - b)$$

ex. Factor Completely:

$$\begin{array}{l}
 x^3 + 64 \\
 x^3 + 4^3 \\
 (x+4)(x^2 - 4x + 16)
 \end{array}
 \qquad
 \begin{array}{l}
 16z^5 - 250z^2 \\
 2z^2(8z^3 - 125) \\
 2z^2((2z)^3 - (5)^3) \\
 2z^2(2z - 5)(4z^2 + 10z + 25)
 \end{array}$$

ex. Factor by grouping:

$$\begin{array}{l}
 (x^3 - 3x^2)(-16x + 48) \\
 x^2(x-3) - 16(x-3) \\
 (x-3)(x^2 - 16) \\
 (x-3)(x+4)(x-4)
 \end{array}
 \qquad
 \begin{array}{l}
 (27p^3 + 45p^2)(-3p - 5) \\
 9p^2(3p+5) - 1(3p+5) \\
 (3p+5)(9p^2 - 1) \\
 (3p+5)(3p+1)(3p-1)
 \end{array}$$

Factor:

$$16x^4 - 81$$

$$(4x^2)^2 - (9)^2$$

$$(4x^2 + 9)(4x^2 - 9)$$

$$(4x^2 + 9)(2x + 3)(2x - 3)$$

$$2c^8 + 10c^5 + 12c^2$$

$$2c^2(c^6 + 5c^3 + 6)$$

$$2c^2(c^3 + 2)(c^3 + 3)$$

Solve:  $3x^5 + 15x = 18x^3$

$$3x^5 - 18x^3 + 15x = 0$$

$$3x(x^4 - 6x^2 + 5) = 0$$

$$3x(x^2 - 5)(x^2 - 1) = 0$$

$$3x(x^2 - 5)(x + 1)(x - 1) = 0$$

$$3x = 0$$

$$x = 0$$

$$x^2 - 5 = 0$$

$$x^2 = 5$$

$$x = \pm\sqrt{5}$$

$$x + 1 = 0$$

$$x = -1$$

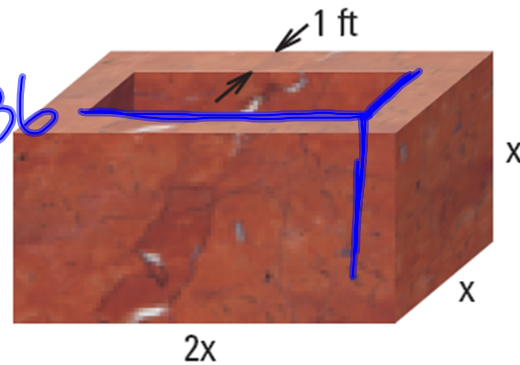
$$x - 1 = 0$$

$$x = 1$$

ex. You are designing a basin that needs to hold 36 cubic feet of water. The sides and base should be 1ft thick and the outer length should be twice its outer width. What are the outer dimensions?

$$(2x-2)(x-2)(x-1) = 36$$

$$= 0$$



Homework: Chapter 5.4 pg.356  
#s 4-28e,32-37,42-44,52