

# Honors Math 3 - Problem Solving w/ Polynomials

②  $x =$  edge of cube

$$V = x^3$$

$V = l \cdot w \cdot h$  & for a cube  $l = w = h$

$$V \text{ of tank} = 2x^3 + 6$$

"6 more than twice the volume of the cube"

$$l = x + 3 \quad w = x + 2 \quad h = x - 1$$

to find volume of tank  $\rightarrow l \cdot w \cdot h$

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

\*we know that  $V = 2x^3 + 6$

$$(x+3)(x+2)(x-1) = 2x^3 + 6$$

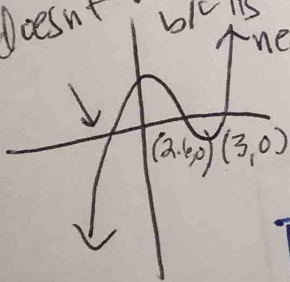
$$(x^2 + 5x + 6)(x-1) = 2x^3 + 6$$

$$x^3 - x^2 + 5x^2 - 5x + 6x - 6 = 2x^3 + 6$$

$$x^3 + 4x^2 + x - 6 = 2x^3 + 6$$

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

doesn't work b/c its negative  $\rightarrow$  Graph in calc!



in calc. table: (3, 0)

$$x = 3$$

$$x = 2.56$$

the cube is	$3 \times 3 \times 3$
the tank is	$6 \times 5 \times 2$

$2.56 \times 2.56 \times 2.56$
$5.56 \times 4.56 \times 1.56$

$x$  = width of bin       $x+2$  = length       $x-3$  = height

$$l \cdot w \cdot h = V$$

$$x(x+2)(x-3) = 70$$

$$(x^2+2x)(x-3) = 70$$

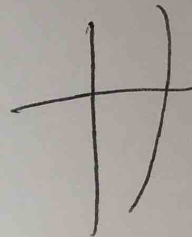
$$x^3 - 3x^2 + 2x^2 - 6x = 70$$

$$x^3 - x^2 - 6x - 70 = 0$$

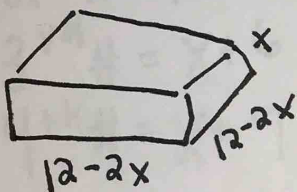
★ Graph in calc!

$$(5, 0)$$

$$x = 5$$



bin is  $5 \times 7 \times 2$



$$x(12-2x)(12-2x) = 12$$

$$x(144 - 48x + 4x^2) = 12$$

$$144x - 48x^2 + 4x^3 = 12$$

$$4x^3 - 48x^2 + 144x - 12 = 0$$

$$x^3 - 12x^2 + 36x - 3 = 0$$

★ reduce!

Graph in calc! ★ none are rational so you must use 2nd trace

$$x = .09$$

$$x = 5.24$$

~~$x = 6.67$~~  ← not possible!

$$x \approx 0.9$$

$$x \approx 5.24$$

- 1<sup>st</sup> # =  $x$   
 2<sup>nd</sup> # =  $x-3$   
 3<sup>rd</sup> # =  $x-5$   
 4<sup>th</sup> # =  $x-7$

$$x = 6$$

$$x(x-5)(x-7) = -6$$

$$x(x^2 - 12x + 35) = -6$$

$$x^3 - 12x^2 + 35x = -6$$

$$x^3 - 12x^2 + 35x + 6 = 0$$

#s are 6, 3, 1, -1

- 8) 1<sup>st</sup> # =  $x$   
 2<sup>nd</sup> # =  $x+3$   
 3<sup>rd</sup> # =  $x+6$   
 4<sup>th</sup> # =  $x+9$

$$x = 6$$

$$x(x+6)(x+9) = 1080$$

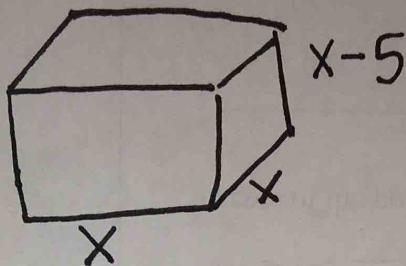
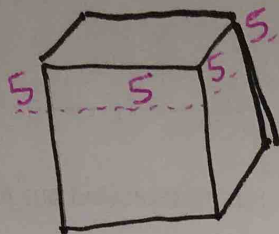
$$x(x^2 + 15x + 54) = 1080$$

$$x^3 + 15x^2 + 54x = 1080$$

$$x^3 + 15x^2 + 54x - 1080 = 0$$

#s are 6, 9, 12, 15





$$x(x)(x-5) = 93$$

$$x(x^2 - 5x) = 93$$

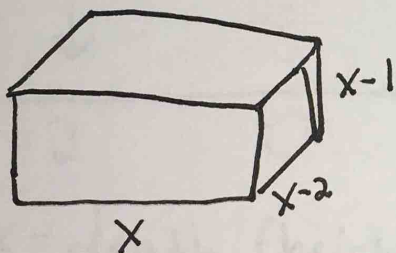
$$x^3 - 5x^2 = 93$$

$$x^3 - 5x^2 - 93 = 0 \text{ Graph in calc!}$$

\*MUST use 2<sup>nd</sup> trace to find 0!

$$x = 6.9 \text{ in}$$

12



$$\begin{aligned} \text{length} &= x \\ \text{width} &= x-2 \end{aligned}$$

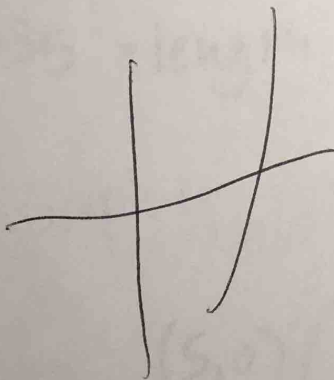
$$\text{height} = x-1$$

$$x(x-2)(x-1) = 60$$

$$x(x^2 - 3x + 2) = 60$$

$$x^3 - 3x^2 + 2x - 60 = 0$$

Graph in calc!



$$x = 5$$

$$\text{dimensions: } 5 \times 3 \times 4$$

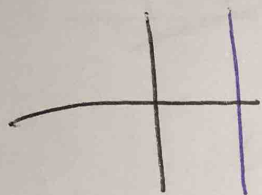
$$(3) \quad 945 = x(12x-15)(12x-21)$$

$$945 = x(144x^2 - 432x + 315)$$

$$945 = 144x^3 - 432x^2 + 315x$$

$$0 = 144x^3 - 432x^2 + 315x - 945$$

Graph in calc



$$x=3$$

← height of block  
if 3m high

$$1) V = 2x^3 + 17x^2 + 46x + 40$$

$$\text{height: } \underline{x+2}$$

$$\text{width: } \underline{x+4}$$

zero  
-2  
-4

$$\begin{array}{r} -2 \overline{) 2 \quad 17 \quad 46 \quad 40} \\ + \downarrow \quad -4 \quad -26 \quad -40 \\ \hline 2 \quad 13 \quad 20 \quad 0 \end{array}$$

$$\begin{array}{r} -4 \overline{) 2 \quad 13 \quad 20} \\ + \downarrow \quad -8 \quad -20 \\ \hline 2 \quad 5 \quad 0 \end{array}$$

length is  $2x+5$

5)  $x = \text{depth (height)}$

$x+5 = \text{width}$

$x+35 = \text{length}$

$$x(x+5)(x+35) = 2000$$

$$x(x^2 + 40x + 175) = 2000$$

$$x^3 + 40x^2 + 175x = 2000$$

$$x^3 + 40x^2 + 175x - 2000 = 0$$

Graph in calc!

(5,0)

dimensions are  $5 \times 10 \times 40$