Secondary Math III
Volume
Assignment 3.1

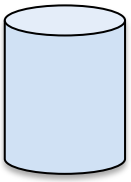
Name_____
Period_____

Find the volume of the indicated solid.

1. *Cylinder*

r = 3 in

h = 10 in



2. *Right circular cone*

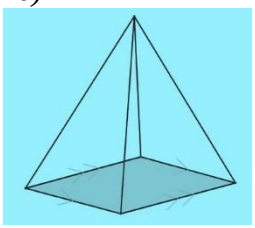
r = 8 cm

h = 20 cm

3. *Square pyramid (base is a square)*

$h = \frac{5}{\sqrt{2}}$ in

$l = 3\sqrt{5}$ in



The figure at the right shows two grain storage silos. The radius of each measures 12 feet and the height of the cylinder measures 51 feet. The height of the cone adds an additional 12 feet.

4. Find the total volume of one silo. (Hint: Find the volume of the cylinder and find the volume of the cone. Then add the two together to find the volume of the silo.)

5. If a bushel of grain is 1.244 $ft.^3$ how many bushels of grain will each silo be able to store. (Assume it can be filled to the top.)

Determine the product of the three linear factors. Verify graphically that the expressions are equivalent.

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

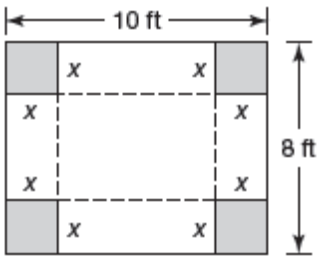
7. $(2x-1)(2x+1)(x+4)$

8. $(4x-7)^3$

9. $(2x-9)(4x^2-5x-12)$

10. Cynthia is an engineer at a manufacturing plant. Her boss asks her to use rectangular metal sheets to build storage bins with the greatest possible volume. Each rectangular sheet is 8 feet by 10 feet.

Cynthia's sketch shows the squares to be removed from the corners of each sheet. The dashed lines indicate where the metal sheets will be folded before they are welded to form the prism-shaped storage bins without tops.

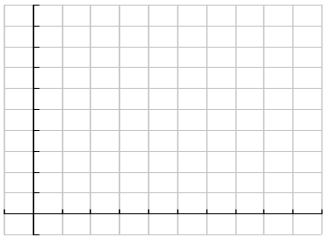


a. Complete the table.

Side Length, *x*, of Removed Squares (ft)	Height of Bin (ft)	Width of Bin (ft)	Length of Bin (ft)	Volume of Bin (ft^3)
0				
1				
2				
3				
4				

b. Write a function *V(x)* to represent the volume of a bin in terms of the side length, *x*, of the removed squares.

c. Graph *V(x)* on your graphing calculator. Use the following window: Xmin = -2, Xmax = 6, Xscl = 1, Ymin = -10, Ymax = 60, Yscl = 5. Sketch the graph below and determine the following:



domain –

maximum volume –

range –

x-intercepts and what they represent –

domain in context of the problem –

range in context of the problem –

d. Cynthia's boss asks her to make several bins with volumes of exactly 40 cubic feet. Determine the bin dimensions that will work by graphing Y2 = 40 and finding the *x*-values of the points of intersection.