**Activity 3.2.1 Polynomial Operations Revisited**

I. The shape below is a rectangular prism with length *3x+2 cm*, width *2x+1 cm*, and height *x+5 cm.*



1. Write a polynomial expression (in standard form) for the area of each rectangular region, A, B, and C:

A=

B=

C=

2. Write a polynomial expression (in standard form) that would represent the *total* surface area of the rectangular prism.

3. Write a polynomial expression (in standard form) that represents the *volume* of the rectangular prism.

II. A rectangular prism has a volume equal to *10x3 – 41x2 + x + 12.* The length is equal to *2x+1* cm and the width is *x-4* cm.

4. Trevor believes that the height should be *5x–3* cm. Do you agree or disagree with Trevor? Explain your answer.

5. Based on your findings above, what would the total surface area of this rectangular prism be?

III. **Revenue, Cost, and Profit: An Example from Business**.

The demand function determines the selling price necessary for an item in order for x units of the item are to be sold. To create a low demand, the price is usually high. To create a large demand, the price is usually low. In business, the company tries to set production at a price that will generate the greatest profit. Profit is found by taking the difference between revenue, R(x), and cost, C(x), of producing x units of the item. The revenue function, R(x), is equal to the number of units sold times the price per unit determined by the demand function, D(x), for that item.

A tech company is making a hard drive whose demand function, D(x) = -.018x2 – 0.03x + 30, for x hundreds of units. If the cost of making x hundred units is given by the function, C(x) = 15x + 100, answer the following questions.

6. What is the function for the revenue generated by selling x hundred units of the hard drive?

7. How much revenue will be generated when 1000 hard drives are sold?

8. What is the function for the profit generated by selling x hundred units of the hard drive?

9. At what level of production will the company begin to make a profit?

10. What level of production should the company establish in order to make a maximum profit? Explain how you determined your answer.