Pre-calculus
Applications 2

1) Measure the dimensions of a coke can and find out the volume of the can in cubic centimeters. Suppose the aluminum that is used in making the top of the can costs .05 cents per square centimeter while the sides and bottom are made of aluminum that costs .02 cents per square centimeter. The soda can's tab costs 1.5 cents. Maintaining the volume of the current coke can, create a cost function. Determine whether coke is packaged in the most cost effective can. Plot a table of values and show the most effective can for the price if you think it differs from the current can design. Should the soda company change the dimensions of its can? Why or why not? Is there anything about the design of the coke can that may affect the accuracy of the measurements? Should there be extra space in the can (how much) or should it be filled to the brim?

2) An aspirin tablet in the shape of a right circular cylinder has a height of 1/3 cm and a radius of 1/2 cm. The manufacturer also wishes to market the aspirin in capsule form. The capsule is to be 3/2 cm in total length, in the shape of a right cylinder with hemispheres attached at both ends. Find a function that represents the volume of the capsule. Find the radius of the capsule so that it's volume is equal to that of the tablet. Include any necessary or helpful graphs complete with explanations. Then, build informative, scale models of the tablet and capsule.

3) The effect of the Earth's gravity diminishes as the distance from the Earth increases. A person's weight at a given height above sea level is described by the function $W(h) = \frac{rw}{h+r}$ where r is the Earth's radius, h is the height above sea level, and w is the person's weight at sea level.
   a) How much lighter is Mr. Rye (200 pounds at sea level) in Spokane (altitude 2000 feet) than at sea level? Round your answer to the nearest thousandth of an ounce.
   b) As you plan to climb Mt. Rainier, how much lighter will your 70 pound backpack be when you reach the summit? Round your answer to the nearest thousandth of an ounce.
   c) How far away (to the nearest mile) would you have to be in order for the backpack to weigh 35 pounds?
   d) Construct a graph (scaled appropriately) that depicts the weight of the backpack as you climb (Increase in altitude). Be sure to include and explain **all** relevant and implied features of the graph.