**A.)**

You have just purchased your first house. Unfortunately, the builder forgot to put a fence around the property and you must now put a fence up so that you can let your pet out in the backyard, without fear of it running away.

You want to fence in a rectangular area, but first you must determine the dimensions of the area.

1. Different pets need to have different areas. For example, a horse needs more space than a dog. Determine an area that is appropriate for your pet.
2. Define the shape of the rectangular area by establishing a relationship between the length and width of the rectangle. For example, L = 2W + 5, or W = 3L – 4. Be sure to include the appropriate units (inches, feet, yards, miles, or meters).
3. Using the fact that A = LW, together with the relationship defined in step 2, eliminate one of the variables to set up a quadratic equation.
4. Solve the quadratic equation using any of the techniques learned in this unit. The solution(s) will be one of the dimensions; use step 2 to find the other.
5. Now determine the perimeter so that you will know how much fencing to buy.
6. Summarize your findings in writing using proper style and grammar.

|  |  |
| --- | --- |
| **B.)**  **BMI** | **Weight Status** |
| Below 18.5 | Underweight |
| 18.5 - 24.9 | Normal |
| 24.9 - 29.9 | Overweight |
| 29.9 and above | Obese |

The BMI is calculated using the formula:

* BMI = 703\*w / h2 where w is the weight in pounds and h is the height in inches.

Solving this formula for h, we see that h = sqrt[703w/BMI]

1. Find the weight of your favorite celebrity. This could be a movie or television personality, athlete, politician or even yourself.
2. Using the weight from part 1, determine the height the celebrity would need to be in order to fall into each of the four weight status categories listed in the table. In other words, select a BMI less than 18.5 (any value, you make it up) and find “h”; then repeat using a new BMI in the range from 18.5 to 24.9, and so on.
3. Using the internet or other Library resource, find the actual height of the celebrity.
4. Determine their actual weight status (underweight, normal, overweight or obese) using the original BMI formula at the top of the instructions.
5. How tall would they need to be for the normal weight status?
6. Think about why there may be differences in your calculations and the actual figures.

**C.)**

Annual profit in thousands of dollars is given by the function, P(x) = 12x - 100, where x is the number of items sold in thousands, x ≥ 10.

1. describe the meaning of the number 12 in the formula, in terms of its meaning in relation to the profit.
2. describe the meaning of the number -100 in the formula, in terms of its meaning in relation to the profit.
3. find the profit for 5 different values of x
4. graph the profit function over its given domain; use the 5 values calculated in part 3 to construct the graph and connect these points with a straight line in Excel or another graphing utility. Insert the graph in a Word file and attach the graph in a Word file to the class DB thread.
5. will this profit function have a maximum, if so, what is it?
6. what steps should the company take to prepare for your answer to part 5?