

Chapter 5 Polynomials of a Higher Degree Word Problems

1. The weight of an ideal round-cut diamond can be modeled by $w = .0071x^3 - 0.090x^2 + .048x$ where w is the diamonds weight (in carats) and x is the diameter (in millimeters) of the diamond. What is the weight of a diamond with a diameter of 15 millimeters.
2. From 1992 to 2003, the number of people in the United States who participated in skateboarding can be modeled by $S = -0.0076t^4 + 0.14t^3 - 0.62t^2 + 0.52t + 5.5$ where S is the number of participants (in millions) and t the number of years since 1992. Graph the model. Use the graph to estimate the first year that the number of skateboarding participants was greater than 8 million. Use the table feature to verify if that number was correct.
3. The models below give the average depth D (in feet) of new wells drilled and the average cost per foot C (in dollars) of drilling a new well. In both models, t represents the number of years since 1980. Write a model for the total cost T of drilling a new well.
 $D = 109t + 4010$ and $C = 0.542t^2 - 7.16t + 79.4$
4. Since 1970, the number (in thousands) of males M and females F attending institutes of higher education can be modeled by $M = 0.091t^3 - 4.8t^2 + 110t + 5000$ and $F = -.19t^3 - 12t^2 + 350t + 3600$ where t is the number of years since 1970. Write a model for the total number of people attending institutes of higher education.
5. Marcie wants to make a box to hold her postcard collection from a piece of cardboard that is 10 inches by 18 inches. What are the dimensions of the box with the maximum volume? What is the maximum volume of the box?
6. You are designing a marble basin that will hold a fountain for a city park. The basin's sides and bottom should be 1 foot thick. Its outer length should be twice its outer width and outer height. What should the outer dimensions of the basin be if it is to hold 36 cubic feet of water?
Hint: $36 = (2x - 2)(x - 2)(x - 1)$ Remember: only real solutions can work
7. Jorge wants to make a box for his coin collection from a piece of cardboard that is 30 centimeters by 40 centimeters. What are the dimensions of the box with the maximum volume and what is that maximum volume?