

# MHF4U: Polynomial Equations Word Problems

1. The population of a small town is modelled by the equation  $P(t)=t^3+19t^2+1100$ , where  $t$  is the time in years since 2019. When will the population of the town be 2000 people?
2. The height of a rider on a section of a roller coaster can be modelled by the quartic function  $h(t)=-t^4+29t^3-291t^2+1179t-1600$ , where  $h$  is the rider's height in feet and  $t$  is the time in seconds. Determine the time(s) where a rider is 20 feet above the ground.
3. A rectangular box has a width that is 1 inch greater than its length, and a height that is 3 inches greater than its length. What are the dimensions of the box if the volume is  $1430 \text{ in}^3$ ?
4. A manufacturer takes pre-made rectangular blocks of aluminum that are  $4 \text{ cm} \times 6 \text{ cm} \times 10 \text{ cm}$ , and removes the same amount of material from the length, width and height. The new blocks of aluminum have volumes of  $64 \text{ cm}^3$ . What are the dimensions of the new blocks?
5. The base of a right triangular prism has a height that is twice its width. Determine the dimensions of the prism if the length is 7 cm longer than the width, and its volume is  $90 \text{ cm}^3$ .

## Solutions

1. In 2025    2. 3, 5, 9 and 12 sec    3. 10 in x 11 in x 13 in    4. 2 cm x 4 cm x 8 cm    5. 3 cm x 6 cm x 10 cm