

Solve the following problems. Please place your answer in the appropriate blank on the answer sheet provided. Include units when applicable. Give answers in decimals (not fractions) to the nearest hundredth, unless otherwise specified.

1. A building needs a ramp to make it handicap accessible. By law, the ramp must run 10 inches horizontally for every 1 inch of rise. If the surface of the ramp is 57 inches long how far above the ground is the inclined end of the ramp? Round to the nearest **tenth** of an inch.
2. Noah and Ben are running in the Gorilla Fun Run. Noah runs at 7 mph and Ben at 5 mph. If they start at the same time, how long (in minutes) will it be before they are  $\frac{1}{3}$  mile apart?
3. Jean invested part of her \$5000 bonus in a certificate of deposit that paid 2% annual, simple interest, and the remainder in a mutual fund that paid 4% annual, simple interest. If her total interest for that year was \$190, how much did Jean invest in the mutual fund?
4. A piece of cardboard is twice as long as it is wide. It is to be made into a box with an open top by cutting 2 cm squares from each corner and folding up the sides. Let  $x$  represent the width of the original piece of cardboard. Find the width of the original piece of cardboard,  $x$ , if the volume of the box is  $1292 \text{ cm}^3$ .
5. An experienced accountant can prepare a tax return in 11 hours. A novice accountant can do the job in 17 hours. How long will it take them to do the job working together?
6. The population growth of an animal species is described by the function,  $F(t) = 400 \log(2t + 3)$  where  $t$  is measured in months. Find the population of this species in an area 6 months after the species is introduced.
7. The stadium vending company finds that sales of hot dogs average 31,000 hot dogs per game when the hot dogs sell for \$2.50 each. For each 50 cent increase in the price, the sales per game drop by 5000 hot dogs. What price per hot dog should the vending company charge to realize the maximum revenue?
8. The population of a particular city is increasing at a rate proportional to its size. It follows the function,  $P(t) = 1 + ke^{0.08t}$  where  $k$  is a constant and  $t$  is the time in years. If the current population is 12,000, in how many years is the population expected to be 30,000?
9. A chemist needs 80 milliliters of a 20% solution but has only 16% and 32% solutions available. Find how many milliliters of each that should be mixed to get the desired solution.
10. Your home state uses a linear model,  $y = 24(x - 70) + 1274$  to predict the number of vacationers ( $y$ ) as compared to the average temperature for that week ( $x$ ). Find the number of vacationers predicted for a week with an average temperature of 85 degrees.