Name: _____ Date: _____

Learning Goal 3.3	Creating confidence in (baby) word problems.

More Questions

1. The volume of a growing spherical cell is $V = \frac{4}{3}\pi r^3$, where the radius r is measured in μm.
   a. Find the average rate of change of V with respect to r, when r changes from 5 to 8μm.
   b. Find the instantaneous rate of change of V with respect to r when $r = 5\mu$m.

2. Suppose a company has estimated that the cost of producing x items is
$$C(x) = 10\,000 + 5x + 0.01x^2.$$
   a. Find the average cost per item for producing 500 items.
   b. Find the marginal cost (instantaneous cost) at the production level of 500 items.
   c. Find the actual change in cost of producing 500 to 501 items.

3. If a tank holds $5\,000$ gallons of water, which drains from the bottom of the tank in 40 minutes, then Torricelli's Law gives the volume V of water remaining in the tank after t minutes as
$$V = 5\,000\left(1 - \frac{t}{40}\right)^2 \quad 0 \le t \le 40$$
   a. Find the rate at which water is draining from the tank after
      i. 5 minutes
      ii. 10 minutes
      iii. 20 minutes
      iv. 40 minutes
   b. At what time is the water flowing out the fastest? The slowest?

4. A stone is dropped into a lake, creating a circular ripple that travels outward at a speed of 60 $^{\text{cm}}/_{\text{S}}$. Find the rate at which the area within the circle is increasing after
   a. 1 second
   b. 3 seconds
   c. 5 seconds