

Lesson 2.

Word Problems

1. The slope $f'(x)$ at each point (x, y) on a curve $y=f(x)$ is given along with a particular point (a, b) on the curve. Use this information to find $f(x)$.

$$f'(x)=x^{-1/2}+x \quad (1,2)$$

2. An environmentalist finds that a certain type of tree grows in such a way that its height $h(t)$ after t years is changing at the rate of

$$h'(t)=0.1t^{1/3}+\sqrt{t} \quad \text{ft/yr}$$

If the tree was 3 feet tall when it was planted, how tall will be in 9 years?

3. A manufacturer estimates that the marginal cost of producing q units of a certain commodity is
- $$C'(q) = 4q^3 - 2q + 24 \text{ dollars per unit.}$$
- If the cost of producing 10 units is \$3,000, what is the cost of producing 20 units?
4. Bob is taking a learning test in which the time he takes to memorize items from a given list is recorded. Let $M(t)$ be the number of items he can memorize in t minutes. His learning rate is found to be
- $$M'(t) = 0.2t - 0.003t^3$$
- a. How many items can Bob memorize during the first 5 minutes?
- b. How many additional items can he memorize during the next 5 minutes?