

Test #1 will be given on Thursday, February 9. It will include material from Sections 1.1, 1.2, 2.1, 2.2, 2.3

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| <p>Chapter 1 Review (p. 83) Concept Check: 6, 7, 8 Exercises: 22</p> | <p>Chapter 2 Review (p. 175) Concept Check: 1(a) - (c), 2, 4, 9, 10 True-False: 4, 5, 6, 7 Exercises: 1 (a) parts (i) - (iv), 1 (d), 3, 4, 5, 7, 8, 10, 19, 21, 23, 25</p> |
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and 2.4.

Answers for even-numbered review exercises from textbook:

Chapter 1 Review Exercises

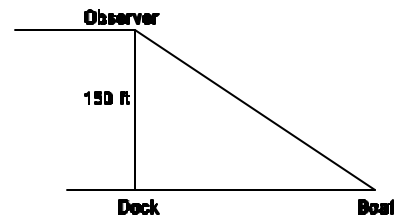
22. (a) $y = 6x + 3000$
 (b) The slope of 6 means that each additional toaster oven produced adds \$6 to the weekly production cost.
 (c) The y-intercept of 3000 represents the overhead cost – the cost incurred without producing anything.

Chapter 2

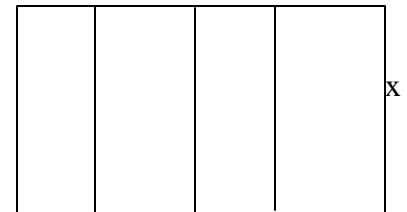
- True-False** 4. False 6. False
Review Exercises 4. 0 8. $\frac{1}{3}$ 10. -1

Additional Review Exercises

1. An observer atop a cliff sees a speedboat approaching a dock located at the base of the cliff directly below the observer. Express the distance from the observer to the boat as a function of the distance from the boat to the dock, if the cliff is 150 feet high. **If y is the distance from the observer to the boat and x is the distance from the boat to the dock, then $y = \sqrt{22500 + x^2}$.**



2. A farmer wants to enclose a rectangular area and then divide it into four smaller rectangular regions by putting up fencing parallel to one side of the rectangle. The total amount of fencing available is 500 feet. An illustration is shown at the right. Express the total area of the enclosed region as a function of x and simplify your answer.



$A = \frac{5}{2}x(100 - x)$ or $250x - \frac{5}{2}x^2$

3. During the years 1986 – 1991, the population of the world appeared to be increasing linearly. In 1986, the world population (in millions) was 4936 and in 1990 it was 5329.
 (a) **Without using the STAT menu of your calculator**, find a linear equation that models the world population as a linear function of time in years after 1986 ($t = 0$ corresponds to 1986).
 $P = 98.25t + 4936$

OVER →

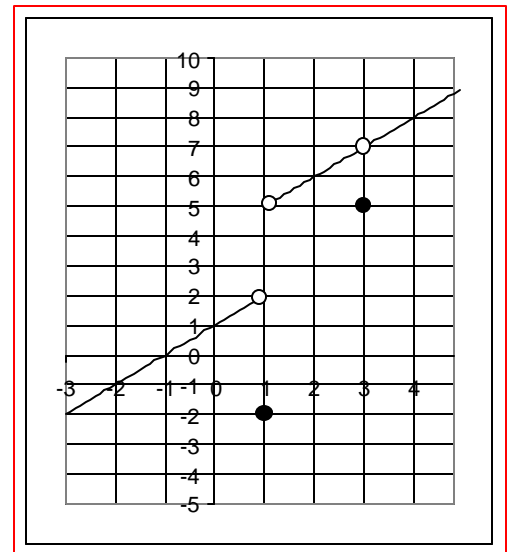
- (b) Write a sentence explaining the meaning of the slope in this equation. Be sure to use units in your answer. Begin your sentence as follows:
 The slope of 98.25 means that during the given time period, the world population increased at a rate of 98.25 million people per year.
- (c) Use your equation to estimate the current world population.
 For 2005 ($t = 19$), $P = 6803$, so the estimate is 6,803,000,000 or about 6.8 billion people.
4. Numerically determine the value of each of the following limits, if possible. If the limit does not exist, explain why.

(a)
$$\lim_{x \rightarrow 5} \frac{\ln x - \ln 5}{x - 5} = .2$$

(b)
$$\lim_{x \rightarrow 3} \frac{|x^2 - 9|}{3 - x} \quad \lim_{x \rightarrow 3^-} \frac{|x^2 - 9|}{3 - x} = 6 \quad \text{and} \quad \lim_{x \rightarrow 3^+} \frac{|x^2 - 9|}{3 - x} = -6$$
 so the limit does not exist because the left-hand and right-hand limits are not the same.

5. Sketch the graph of a function which satisfies all of the following conditions:

$$f(1) = -2, f(3) = 5, \lim_{x \rightarrow 1^-} f(x) = 2, \lim_{x \rightarrow 1^+} f(x) = 5, \text{ and} \\ \lim_{x \rightarrow 3} f(x) = 7.$$



6. Find the limit:
$$\lim_{h \rightarrow 0} \frac{\sqrt{x+h} - \sqrt{x}}{h} = \frac{1}{2\sqrt{x}}$$

7. Find all values of k such that f is continuous for all x if
$$f(x) = \begin{cases} x+1 & \text{if } x < k \\ x^2 & \text{if } x \geq k \end{cases}$$

$$k = \frac{1 \pm \sqrt{5}}{2} \approx 1.62 \quad \text{and} \quad -.62$$