Exam 2 Review Memo Review Problem Answers, Fall 2012

Chapter 3 Review problems (page 219, algebra part of textbook, 1st half)

9) $m = -\frac{1}{2}$

11) $m = \frac{3}{4}$

13) $m = \frac{2}{3}$

15) undefined slope

17) $m = -1$

18) positive slope

19) negative slope

20) undefined slope

21) zero slope

24) Average rate of change = \$1378/year

25) *a*) $y = -\frac{1}{3}x - 1$ *b*) $x + 3y = -3$

26) *a*) $y = -2$ *b*) $y = -2$

27) *a*) $y = -\frac{4}{3}x + \frac{29}{3}$ *b*) $4x + 3y = 29$

29) *a*) no slope-intercept form *b*) $x = 2$

31) *a*) $y = \frac{7}{5}x + \frac{16}{5}$ *b*) $7x - 5y = -16$

32) *a*) $y = -x + 2$ *b*) $x + y = 2$

33) *a*) $y = 4x - 29$ *b*) $4x - y = 29$

34) *a*) $y = -\frac{5}{2}x + 13$ *b*) $5x + 2y = 26$

36) *a*) $y = \frac{56}{15}x - \frac{49}{5}$ *b*) $56x - 15y = -378$

Chapter 1 Review problems (page 39, calculus part of textbook, 2nd half)

4) false (The line has undefined slope, so is a vertical line.)

5) true

6) false (The *y*-intercept is (0, 9). The *x*-intercept would be $\left(-\frac{9}{8}, 0\right)$.

7) true

9) false (The lines are not perpendicular because the slopes are not negative reciprocals.)

10) false (The lines are not parallel, because the slopes are not the same.)

15) $m = 1$

19) $m = -\frac{4}{3}$

21) $m = 0$

25) $y = \frac{2}{3}x - \frac{13}{3}$

27) $y = -x - 3$

29) $y = -10$

31) $2x - y = 10$

32) $5x - 8y = -40$

34) $x = 7$

37) The graph has a *y*-intercept at (0, 3) and a slope of 4.

39) The graph has a *y*-intercept of (0, -3) and an *x*-intercept of (5,0).

41) The graph is a vertical line intersecting the *x*-axis at 3.

42) The graph is a horizontal line intersecting the *y*-axis at 1.

47) $C(n) = \frac{1}{2}n + 10$, where n is number of pills and C is cost in dollars

55) a) 40 pounds is the break-even quantity.
b) The revenue of 40 pounds is $280.

56) $A(t) = \frac{236}{7}t + \frac{478}{7}$, where t is the number of years since 2000 and A is the amount of imports from China in billions of dollars.

59) $C = 836t + 7500$, where C is the cost of a new car for t years since 1980.

62) $y = -0.691x + 132.3$

Chapter 3 Review (page 188 of calculus part of text, 2nd half of book)

17) a) 4 b) 4 c) 4 d) 4

18) a) -2 b) 2 c) does not exist d) -2

19) a) ∞ b) $-\infty$ c) does not exist d) does not exist

20) a) 1 b) 1 c) 1 d) does not exist

21) ∞

23) $\frac{19}{9}$

25) 8

27) -13

29) $\frac{1}{6}$

31) $\frac{2}{5}$

33) $\frac{3}{8}$

35) x_2, x_4

47) average rate of change = 126; instantaneous rate of change at $x = 1$ is 18

49) average rate of change = $\frac{9}{77}$; instantaneous rate of change at $x = 4$ is $\frac{18}{49}$

51) *a*) $y = 13x - 17$ *b*) $y = 7x - 5$

53) *a*) $y = -x + 9$ *b*) $y = -3x + 15$

54 *a*) $y = \frac{2}{5}x + 6$ *b*) $y = \frac{1}{2}x + \frac{3}{2}$

62) *a*) $R'(x) = 16 - 6x$ *b*) $R'(10) = -44$
The business is losing \$44 for each \$100 spent on advertising.

Chapter 4 Review (page 244 calculus part of textbook, 2nd half of book)

1) false (The derivative of a constant is zero.)

5) false (The product rule is used, not the chain rule.)

11) $y' = 5x^3 - 7x^2 - 9x + \sqrt{5}$

14) $y' = 12x^{-4}$ or $\frac{12}{x^4}$

15) $f'(x) = \frac{-12}{x^5} + \frac{3}{\sqrt{x}}$

17) $k'(x) = \frac{21}{(4x+7)^2}$

19) $y' = \frac{x(x-2)}{(x-1)^2}$

21) $f'(x) = 24x(3x^2 - 2)^3$

23) $y' = \frac{7t^6}{\sqrt{2t^7 - 5}}$

25) $y' = 3(2x+1)^2(6x+1)$

27) $r'(t) = \frac{-15t^2 + 52t - 7}{(3t+1)^4}$

51) *a*) $-\frac{3}{2}$ *b*) $-\frac{24}{11}$

53) $y = -2x - 4$

55) $y = -\frac{3}{4}x - \frac{9}{4}$

57) $y = \frac{3}{4}x + \frac{7}{4}$

67) $\left(\overline{C}\right)'(x) = \frac{-x-2}{2x^2\sqrt{x+1}}$

73) (Go to next page.)

a) $\frac{dS}{dx} = 22$ \$22 million expenditures for each thousand dollars spent on research

b) $\frac{dS}{dx} = 19.5$ \$19.5 million expenditures for each thousand dollars spent on research

c) $\frac{dS}{dx} = 18$ \$18 million expenditures for each thousand dollars spent on research

74) a) marginal profit when 4 units have been sold: \$49.38/unit
b) marginal profit when 12 units have been sold: \$49.92/unit
c) marginal profit when 20 units have been sold:

75) a) $T'(9) = -2.2$ (in thousands)
Total cost for company is decreasing by \$2200 when \$900 is spent on training.

b) $T'(19) = -0.5639$ (in thousands)
Total cost for company is decreasing by \$564 when \$1900 is spent on training.

88) a) average velocity between 1 and 3 seconds is -5 feet/sec.
b) instantaneous velocity at 3 seconds is -1.7 feet/sec.