

## Even Answers for Chapter 2 Problems (2<sup>nd</sup> half of text)

### Section 2.1

- 6) slope is  $\frac{4}{3}$                       8) slope is  $\frac{1}{4}$                       10) slope is -3
- 50) differentiable at all  $x$  except -3 and 3, where there are cusps  $(-\infty, -3) \cup (-3, 3) \cup (3, \infty)$
- 54) differentiable at all  $x$  except -2 and 2, where the function is not defined  $(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$

### Section 2.2

2. (a)  $y = x^{3/2}$

$$y' = \frac{3}{2}x^{1/2} = \frac{3\sqrt{x}}{2}$$

At (1, 1),  $y' = \frac{3}{2}$ .

(b)  $y = x^3$

$$y' = 3x^2$$

At (1, 1),  $y' = 3$ .

8)  $g'(x) = 3$                       14)  $y' = 6x^2 - 2x + 3$

18)  $y' = \frac{4}{3}x^{-\frac{2}{3}}$  or  $\frac{4}{3\sqrt[3]{x^2}}$

<u>Function</u>	<u>Rewrite</u>	<u>Differentiate</u>	<u>Simplify</u>
22. $y = \frac{2}{3x^2}$	$y = \frac{2}{3}x^{-2}$	$y' = -\frac{4}{3}x^{-3}$	$y' = -\frac{4}{3x^3}$

28)  $f'(t) = \frac{4}{3t^2}$                        $f'\left(\frac{1}{2}\right) = \frac{16}{3}$

30)  $y' = 9x^2$     at  $x = 2$ ,  $y' = 36$

36)  $f'(x) = 2x + 4 - \frac{1}{x^2}$                       38)  $f'(x) = 3x^2 + 6x + 2$

40)  $f'(x) = 12x^3 - 15x^2 + 12x - 10$                       44)  $f'(x) = -12x + 3 - \frac{1}{x^2}$

48)  $y = 4x + 2$

52) points: (0,0) and (-2, 4)

54) point (-1, -1)

**Section 2.3**

12(a) The average rate of change is increasing at the greatest rate in the interval [1, 2] and decreasing at the greatest rate in the interval [5, 6].

30) (a) \$2394 (b) \$2416 (c) The answers are close.

**Section 2.4**

2)  $f'(x) = 6x^2 + 10x + 2, f'(-1) = -2$  8)  $h'(x) = \frac{x^2 + 6x}{(x+3)^2}, h'(-1) = -\frac{5}{4}$

10)  $f'(x) = \frac{12 - 3x^2}{(x^2 + 4)^2}, f'(-1) = \frac{9}{25}$

24)  $h'(t) = 28t^6 - 42t^5 - 15t^4 - 8t + 7$

30)  $f'(x) = \frac{x^4 - 6x^2 - 4x - 3}{(x^2 - 1)^2}$

40)  $y = -24x - 39$

42)  $y = -3x + 11$

46) (0, 0)

48) (0, 3), (-1, 2), (1, 2)

58) (a) approximately -3.88% / day

(b) approximately -0.24% / day

64) (a)  $M'(t) = \frac{300(1-t^2)}{(t^2+1)^2}$

(b)

$M(3) = 98$  (98 memberships in 3 months)

$M'(3) = -24$  (-24 memberships /month, losing 24 memberships/month)

$M(24) \approx 20.48$  (about 20 memberships in 24 months)

$M'(24) \approx -0.52$  (-0.52 memberships/month, losing about .52 memberships/month)

## Section 2.5

18)  $y' = 24x(3x^2 + 1)^3$                       20)  $h'(t) = -8t(1 - t^2)^3$

24)  $f'(t) = 6(9t + 2)^{-\frac{1}{3}}$  or  $\frac{6}{\sqrt[3]{9t + 2}}$

26)  $g'(x) = (2x + 3)^{-\frac{1}{3}}$  or  $\frac{1}{\sqrt[3]{2x + 3}}$

30)  $y' = -2x(4 - x^2)^{-\frac{1}{2}}$  or  $\frac{-2x}{\sqrt{4 - x^2}}$

48)  $f'(x) = \frac{-18x^2}{(x^3 - 4)^3}$                       50)  $y' = \frac{-1}{2(x + 2)^{\frac{3}{2}}}$

52)  $g'(x) = \frac{-3x^2}{(x^3 - 1)^{\frac{2}{3}}}$                       66)  $y = -\frac{3}{16}x + \frac{17}{16}$

## Section 2.6

4)  $f''(x) = 6$                       6)  $f''(x) = 48x^2 - 16$  or  $16(3x^2 - 1)$

12)  $g''(t) = -24(t + 2)^{-4}$  or  $\frac{-24}{(t + 2)^4}$

14)  $h''(s) = 20s^3 - 24s^2 + 6s$  or  $2s(10s^2 - 12s + 3)$

34)  $x = 0$