

**Even Answers to Paper Homework Problems**  
**Lessons 9 – 18**

Homework 9 page 135:

- 10) (a) 1, 1, 1, 2 (b) 0, 0, 0, 0

Homework 10 page 135:

- 32) -4 34)  $\frac{6}{5}$  36) 7 38)  $\frac{1}{4}$   
54) -1 56) (a) does not exist (b) 7

Homework 11 page 158:

- 12) velocity = 28  
26) (a) \$5998/unit (b) \$6000/unit (c) \$5998  
(d) Answers to parts *a* and *c* are very close to the answer to part *b*.  
42) (b) average velocity = 2 ft./sec. (c) average velocity = 3 ft./sec.

Homework 12 page 176:

- 36) There is no derivative when  $x = -6$ . The function is not defined at  $x = -6$ .  
56) (a) 57 more g/min. (b) 0 more g/min.

Homework 13 page 207:

- 4)  $20x^3 + 27x^2 + 24x - 7$  8)  $-\frac{500}{\sqrt{x}} - \frac{22}{3x^{1/3}}$   
10)  $-\frac{25}{x^6} + \frac{12}{x^3} - \frac{13}{x^2}$  12)  $-\frac{14}{t^2} - \frac{48}{t^5}$   
16)  $-\frac{1}{2x^{3/2}} + \frac{21}{x^{5/2}}$  20)  $\frac{5}{2}x\sqrt{x} - \frac{2}{\sqrt{x}}$   
24) (a) or quadratic 28)  $\frac{-2}{x^4\sqrt{x}} + \frac{9}{2x^2\sqrt{x}}$

Homework 14 page 207:

- 32) slope is -23, equation of tangent line at  $P(1, -7)$  is  $y = -23x + 16$   
52) (a) marginal profit at 500 units is \$30/ unit (a gain of \$30 per unit)  
(b) marginal profit at 815 units is \$4.80/ unit (a gain of \$4.80 per unit)  
(c) marginal profit at 1000 units is -\$10/ unit or a loss of \$10 per unit  
56) (a) marginal cost function:  $C'(x) = 2$   
(b) marginal revenue function:  $R'(x) = 6 - \frac{1}{500}x$   
(c) marginal profit function:  $P'(x) = 4 - \frac{1}{500}x$   
(d) Marginal profit is zero when  $x = 2000$  items.  
(e) Profit is \$4000 when the marginal profit is 0.  
60) (a) Blood sugar level for 0 units of insulin is 450.  
(b) Blood sugar level for 25 units of insulin is 325.

- (c) The rate of change in blood sugar after 10 units of insulin is  $-4$  units per hour (a drop of 4 units per hour).
- (d) The rate of change in blood sugar after 25 units of insulin is  $-10$  units per hour (a drop of 10 units per hour).

Homework 15 page 216:

34)  $y = 11x - 6$

50) (a)  $N'(t) = 9t^2 - 120t + 300$

- (b) Population after 8 hours is decreasing by 84 million per hour.  
Population after 11 hours is increasing by 69 million per hour.

Homework 16 page 216:

40)  $x \approx 4.828, x \approx -0.828$

There are no bold problems for homework 17.

Homework 18 page 225:

50) The tangent line is horizontal when  $x = -\frac{2}{\sqrt{7}}$  or  $x = \frac{2}{\sqrt{7}}$ .

54) (a) \$148.78 per TV set                      (b) \$187.29 per TV set

(c) \$214.34 per TV set

- 62) (a) At the start, the bacteria are increasing by 6 million per hour.
- (b) After  $1 \frac{2}{5}$  hours, the bacteria number are increasing by 9.75 million per hour.
- (c) After 8 hours, the bacteria are increasing by about 19.71 million per hour.