Grima MAT 212
Chapter 2 – extra practice test

#1-13: Use the appropriate technique to find the derivative of the function below.

1) $f(x) = 3x^2 + 7x - 9$

2) $f(x) = \frac{14}{x^2}$

3) $f(x) = 20\sqrt{x}$

4) $f(x) = \frac{24x^2+12x}{6x}$

5) $f(x) = (2x + 5)(9x + 4)$

6) $f(x) = \frac{4x}{2x-5}$

7) $f(x) = 6(7x + 2)^2$

8) $f(x) = 2x(4x + 5)^2$

9) $f(x) = e^{15x}$

10) $f(x) = (3x + 1)e^{2x}$

11) $f(x) = \frac{x^5}{e^x}$

12) $f(x) = \ln(7x^2)$

13) $f(x) = 13xln(x)$

14) $f(x) = 3x^2 + 9x + 3;\ \ x = 5$

a) Find the slope of the tangent line to the graph of f(x) for the given value of x

b) Find the equation of the tangent line to the graph of f(x)for the given value of x.

15) $f(x) = e^{9x^2}$

a) Find all values of x where the tangent line to the graph of f(x) is horizontal.

b) Find the equation of the tangent line to the graph of the function for the values of x found in part a.

16) Bob's hacky sack company determines the profit function for producing and selling a certain hacky sack can be modeled by: $P(x) = -0.8x^2 + 40x$

Where x represents the number of hacky sacks sold and P(x) represents the monthly profit in dollars.

Find the following:

a) P(20)

b) Explain using words what your answer to part **a** means.

c) Find $P'(x)$ d) Find $P'(20)$

e) Explain using words what your answer to part **d** means.

Answers:

1) $f'(x) = 6x + 7$

2) $f'(x) = -\frac{28}{x^3}$

3) $f'(x) = \frac{10}{\sqrt{x}}$

4) $f'(x) = 4$

5) $f'(x) = 36x + 53$

6) $f'(x) = \frac{-20}{(2x-5)^2}$

7) $f'(x) = 84(7x + 2)$

8) $f'(x) = 2(4x + 5)(12x + 5)$

9) $f'(x) = 15e^{15x}$

10) $f'(x) = e^{2x}(6x + 5)$

11) $f'(x) = \frac{x^4(5-x)}{e^x}$ *numerator may be written differently*

12) $f'(x) = \frac{2}{x}$

13) $f'(x) = 13(1 + \ln(x))$ *or* $13(\ln(x) + 1)$

14a) $m = 39$

14b) $y = 39x - 72$

15a) $x = 0$

15b) $y = 1$

16a) $P(20) = 480$

16b) The total monthly profit will be $480 in a month where 20 hacky sacks are sold.

16c) $P'(x) = -1.6x + 40$

16d) $P'(20) = 8$

16e) An additional profit of $8 will be made when the 21st hacky sack is sold in a month.