Calculus I Review #2 – Fall 2018

1. Find the derivative of:

 a) f(x) = 3√(x)

 b) f(x) = $x^{2}sinx$

 c) f(x) = $\frac{x-3}{x^{4}}$

 d) f(x) = $(x^{2}+3)^{4}$

 e) f(x) = cos(2x)

 f) f(x) = $tan^{2}$x

2. Using implicit differentiation, find the derivative with respect to x of f(x) = $2x^{2}+xy-y^{2}=2$

3. Air is being pumped into a spherical balloon at a rate of 10 cubic centimeters per minute. Determine the rate at which the radius of the balloon is increasing when the diameter of the balloon is 25cm.

4. Find linear approximation of $\sqrt[3]{2-x}$ and use it to approximate $\sqrt{1.9} and \sqrt{2.1}$.

5. Find the absolute minimum and absolute maximum of f(x) = $x^{3}+ 2x^{2}-4x+1$ on the interval [-2, 4].

6. Verify that the function satisfies the three hypotheses of Rolle’s Theorem on the given interval. Then find all numbers c that satisfy the conclusion of Rolle’s Theorem.

f(x) = $4x^{2}$+5x+2 on [-1, 4].

7. Verify that the function satisfies the hypotheses of the Mean Value Theorem on the given interval. Then find all numbers c that satisfy the conclusion of the Mean Value Theorem.

f(x) = $\sqrt[3]{x}$ on [0, 8].

8. Sketch the graph that satisfies all the following conditions:
f(0) = f’(0) = f’(3) = f’(5) = f’(6) = 0

f’(x) > 0 if 0 < x < 3 or 5 < x < 6

f’(x) < 0 if 3 < x < 5 or x > 6

f”(x) > 0 if 1 < x < 3 or 4 < x < 5

f”(x) < 0 if 3 < x < 4 or x > 5 or 0 < x < 1

Label local maximums and minimums and inflection points.