CALCULUS I—Worksheet #20

1. Find c for Rolle's Theorem for $f(x) = x^3 - 4x$ on $[-2,2]$.

2. Find c for the Mean Value Theorem for $f(x) = \frac{x-1}{x}$ on $[1,3]$.

3. Find c for Tolle's Theorem for $f(x) 3x^2 - 12x$ on $[0,4]$.

4. Find c for the Mean Value Theorem for $f(x) = x^3 + 1$ on $[-2,4]$.

5. Why does $f(x) = \sqrt{x+1}$ not hold true for the Mean Value Theorem on [-2,2]?

6. $f(x) = \frac{x^2 - 1}{x - 1}$ when x is not 1 and $f(x) = 1$ when $x = 1$

   a) Is f continuous at x = 1?

   b) Is f continuous at x = 0?

   c) Is f continuous at x = -1?

7. $f(x) = \frac{x^2 - 16}{x - 4}$ when x is not 4 and $f(4) = k$. Find k so that f is continuous at $= 4$.

8 – 10 Solve the following using variables separable:

8. If $\frac{dy}{dx} = x^2 - 2$ and $y = -3$ when $x = 1$, then find y.

9. $\frac{dy}{dx} = x^2\sqrt{y}$

10. $\frac{dy}{dx} = \frac{x+1}{y-1}$

11. $\int \cos^3 4x\, dx$

12. $\int \cos^2 4x\, dx$

13. $\int_1^2 2^x\, dx$