MATH2215 Due: March 25, 2020

Name _____ Worksheet 1

1. If the sum of the height and radius of a cone is 15in, find the dimensions of the cone with maximum volume (volume of a cone is: $V = \frac{\pi}{3} r^2 h$)

2. Find the indefinite integrals (anti-derivative).

a) $\int 8x^{1/3} - 10x^4 + e^x + \frac{1}{x} dx$

b) $\int (x^2 + 3)(2x + \frac{1}{x^2}) dx$

c) $\int \frac{4x - 3x^6}{x} dx$

3. Let $f(x) = \dfrac{x^2 - 8}{x - 1}$.

   a. Find the domain of $f(x)$ and the x and y-intercepts.

   b. Does $f(x)$ have any symmetry, if so what kind?

   c. Find the horizontal, vertical & slant asymptotes (if any) of $f(x)$.

   d. Where is $f(x)$ increasing? Where is $f(x)$ decreasing?

   e. Find any local maximum and local minimums of $f(x)$.

   f. Where if $f(x)$ concave up? Where is $f(x)$ concave down?

   g. Find any inflection points of $f(x)$.

   h. Sketch $f(x)$ (label any local max or mins and inflections points).