Math 2143 - Brief Calculus with Applications

Exam #2 - 2014.11.06

Name: _____

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1. (10 pts.) Sketch the graph of

$$f(x) = \frac{2(x-3)^2}{(x+2)(x-1)}$$

without taking derivatives. (Thus, find domain, horizontal and vertical asymptotes, and intercepts).

2. (10 pts.) Sketch the graph of

$$g(x) = \frac{1}{3}x^3 - \frac{1}{2}x^2 - 2x - 1$$

by finding the y-intercept, critical points, intervals of increase and decrease, inflection points, and intervals of concavity.

3. (10 pts.) Find the absolute maximum and minimum of the function

$$h(x) = \frac{1}{4}x^4 + \frac{1}{3}x^3 - x^2 + 5$$

on the interval $[-3, 2]$.

4. (10 pts.) Approximate $\sqrt[3]{26}$ as a fraction using differentials.

5. (10 pts.) If $\sqrt{x} + \sqrt{y} = 3$, compute $\frac{dy}{dx}$.

6. (10 pts.) You are pouring paint into a puddle on the floor, forming a perfect circle while doing so. When the radius of this paint circle is 2 feet, you calculate that the change in area is $\frac{1}{4}\pi$ feet^2 per second. At what rate is the radius increasing in this instant?