Pre-Calculus B 120

Test : Curve Sketching and Related Rates

NAME:

(value = 20)

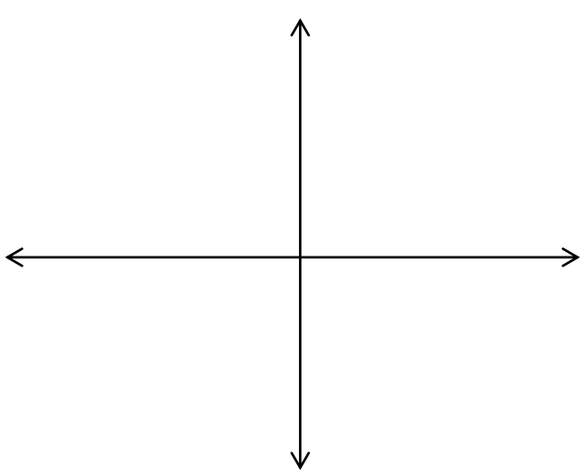
(John Abbott College: Final Exam 2015)

1. Consider the function : $f(x) = \dfrac{(5x+4)(x-4)}{x^2}$

given $f'(x) = \dfrac{16(x+2)}{x^3}$ and $f''(x) = \dfrac{-32(x+3)}{x^4}$

Supply the information requested in the boxes at right and give a careful sketch of f on the axes below.

x-intercept(s)
y-intercept(s)
Vertical asymptote(s)
Horizontal asymptote(s)
Region(s) of increase
Region(s) of decrease
Local maxima
Local minima
Region(s) where concave up
Region(s) where concave down
Point(s) of inflection



2. Consider a paper cup shaped like a cone with height of 12 cm and radius (at the top) of 5 cm. If water is poured into the cup at a rate of 3 cm^3/s, how fast is the water level rising when the water is 7 cm deep inside the paper cup? [6]

3. A girl is flying a kite on a string. The kite is maintaining a height of 120 feet while the wind is blowing the kite horizontally away from the girl at 6 ft./s. At what rate must she be letting out string the instant that there is 130 feet of string out if the kite is to maintain a height of 120 feet? [6]

4. Given the function $f(x) = 2x^3 - 15x^2 - 144x + 1$ …

(a) Determine the coordinates of all relative extrema and inflection points on the interval $(-\infty, \infty)$ [10]

(b) Determine the **absolute maximum and minimum** values of $f(x)$ on the interval $[-4, 0]$**.** [3]