Name _____ Calculus

Chapter 4 Practice Test

1. Use the first derivative test to find the local maximum and minimum values of the function.

   f(x) = $x^3 - 4x^2$

2. Find the inflection points and list the intervals where the function is concave up and where it is concave down.

   f(x) = ¼ $x^4 - 2x^2$

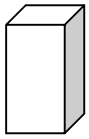
3. Use the Mean Value Theorem to find c on the interval [0, 4] of f(x) = $x^2 - 2x$.

4. Find <u>all</u> asymptotes of the function f(x) = $\dfrac{2x^2 + 1}{x^2 - 2x - 15}$

5. The measurement of the edge of a cube is 8 inches, with a possible error of 0.25 in. Use differentials to approximate the maximum possible propagated error in computing the volume of the cube.

6. Compare the values of Δy and *dy* given the following information: $dy = f'(x)\,dx$
   $y = 3x^4$ $x = 1.5$ $\Delta x = dx = 0.1$ Δy = actual change in y

7. A rectangular solid with a square base has a surface area of 420 square inches.

   a. Determine the dimensions of the solid that give it the maximum volume.

   b. Calculate the volume of the solid.

8. A rancher has 900 feet of fencing and wants to make 3 pens as shown here:
   What dimensions should be used to enclose the maximum area?

8. Analyze and sketch the graph of $y = \frac{x^2}{x^2 - 4}$. List the following features, if they exist.

a. x-intercept(s):

b. y- intercepts(s):

c. Vertical asymptotes:

d. Horizontal asymptotes:

e. Slant asymptote:

f. Domain:

g. Range:

h. First derivative:

i. Critical numbers:

j. Intervals where function is increasing/decreasing:

k. Second derivative:

l. Points of inflection:

m. Intervals where function is concave up/down:

n. Attach sketch of graph on the following sheet.