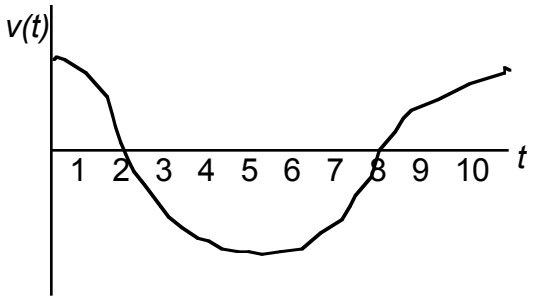
PreCalc BC **Review- 2** **Name:**

1. Use analytic methods to find and identify extrema and points of inflection. Organize information in a sign chart and sketch: $f(x) = x^4 - 4x^3 + 10$

2. Shown at right is a velocity graph of a car.
a) When is the car at rest?
b) When is the acceleration zero?
c) When is the car's speed greater than its velocity?
d) When does the car return to its starting point?



3. A rectangle has its base on the x-axis and its upper two vertices on the parabola $y = 12 - x^2$. What is the largest area the rectangle can have and what are its dimensions?

4. What are the dimensions of an opened-top cylindrical container with minimal surface area and a volume of 500 cubic inches?

5. The position of a particle for $t > 0$ is given by $s(t) = e^t - t^3$
a) Find an equation for the velocity .
b) Determine (analytically with calculator) when the particle is at rest
c) Find an equation for the acceleration

6. Write an equation for the tangent to the parabola $y = x^2 - 5x + 3$ at its y-intercept.

7. Find values for *a, b, c, d* and *e* so that the quartic $y = ax^4 + bx^3 + cx^2 + dx + e$ is the best possible approximation of $f(x) = e^x$, at x = 0. (The "best possible approximation" will give the same values for the first 4 derivatives). Use your approximation to estimate $\sqrt[10]{e}$.