1. Express the surface area of a cube as a function of its volume. (Hint: Remember the surface area of a cube is  $SA = 6x^2$  & volume of a cube is  $V = x^3$  in terms of the length of one of its sides x)

2. Write the following expression as a single logarithm  $3\ln x + 2\ln y - 4\ln \left(x+y\right)$ 

3. Classify each function as a power function, root function, polynomial (state degree), rational function, trigonometric function, exponential function or logarithmic function.

a) 
$$f(x) = \sqrt[3]{x^2 - 4x + 1}$$

b) 
$$f(x) = \cos 2x$$

c) 
$$f(x) = \frac{x-6}{x^2-4}$$

4. At time t = 0, a diver jumps from a platform diving board that is 32 feet above the water. The position of the diver is given by

$$s(t) = -16t^2 + 16t + 32$$

where s is measured in feet and t is measured in seconds.

a) When does the diver hit the water?

b) What's the diver's velocity at impact? (Take the solution from (a), let's call it c and find average velocity of the intervals [c, c+0.5], [c, c+0.1], [c, c+0.01], [c, c+0.01] and estimate instantaneous velocity).