Homework 2.5 – Linear Approximation

1. (1 pt) alfredLibrary/AUCI/chapter2/lesson5/leibniz2pet.pg NOTE: <u>Units</u> are required in the answer blank on the right side of each equal sign. Complete this problem on paper first so you can practice writing Leibniz notation.

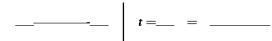
The position s (in miles) of a car at time t (in hours) is given by

$$s(t) = -8t^3 - 5t^2 + 5t - 4.$$

(a) The velocity v of the car is given by the formula

(b) The velocity of the car at time t = 6.5 hours is

=



(c) The acceleration of the car is given by the formula

(d) The acceleration of the car at 6.5 hours is

_____ t =___ = ____

2. (1 pt) alfredLibrary/AUCI/chapter2/lesson5/differential2p.pg Recall that

 $\Delta y = y(x + \Delta x) - y(x)$ and dy = y'(x)dx.

Let $y = 2x^2$.

(a) Find Δy when x = 2 and $\Delta x = 0.4$:

Δy = _____

(b) Find the differential dy when x = 2 and dx = 0.4:

dy = _____

3. (1 pt) alfredLibrary/AUCl/chapter2/lesson5/errorprop2p.pg The radius of a circular disk is measured as 24 cm with a maximum error in measurement of ± 0.1 cm. Use differentials to estimate the propagated error and the relative error in the calculated area of the disk.

Propagated error $\approx \pm$ _____ square centimeters Relative error (as a unitless decimal) $\approx \pm$ _____

4. (1 pt) alfredLibrary/AUCl/chapter2/lesson5/error10pet.pg An oil tank in the form of a right circular cylinder of radius of r has a height h of 37 meters and a volume of $V = 37\pi r^2$. The radius is measured as 12 meters with a maximum possible error of ± 0.1 meters. Estimate the propogated and relative errors in the calculated volume of the tank.

Propagated error $\approx \pm$ _____(Your answer requires <u>units</u>.)

Relative error (as a percentage) $\approx \pm$ _____

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