

Mr. Staszko**Math 101A Chapter 2 Sample Test**

Show your work to receive credit.

I. a) What does a derivative measure for a “math” point view? What does it mean for $f(2) = 3$ and $f'(2) = 4$? (8 pts)

b) What does a derivative measure for a “physics” point view? What does it mean for $\frac{dV}{dt} = 5$ where $V =$ volume (ft^3) and $t =$ time in seconds. (8 pts)

II. State the limit definition of the derivative and use it to find the derivative of:
 $f(x) = x^2 - 5x + 2$ (8 pts)

III. Estimate the value of $f'(x)$ from the given data. (8 pts)

x	0	0.5	1	1.5	2
$f(x)$	2.0	2.6	3.0	3.4	4.0

IV. Find the equation of the line tangent to $f(x) = x^2 - 5x + 2$ at $x = 3$. (8 pts)

V. Use the derivative formulas along with the Chain Law to find $\frac{dy}{dx}$: (8 pts ea) (simplify answers)

1. $y = x^3 + 4\sqrt{x} - \frac{1}{x^2} - 5x$

2. $y = x^3\sqrt{x^2 + 4}$

3. $y = \frac{(x^2 + 1)^3}{2x + 5}$

4. $y = e^{\tan^{-1}(2x)}$

5. $x^3 \sin(5x^2)$

6. $x^2 - y^3 + 2xy = x + 5$

7. $y = \frac{e^{x^2}\sqrt{6x-5}}{(\sin x)^3}$ (logarithmic differentiation)

VI. Use the position function below to find the velocity and acceleration at $t = 2$.

$$s(t) = \sqrt{2t + 21} + 5$$