

SCORE: ___ / 10 POINTS

What month is your birthday ?

What are the first 2 digits of your address ?

What are the last 2 digits of your zip code ?

What are the last 2 digits of your social security number ?

[IF YOU DO NOT HAVE A SOCIAL SECURITY NUMBER,
USE YOUR STUDENT ID NUMBER]If an arrow is fired upward with a velocity of 55 m/s, its height in meters t seconds later is given by

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$$y = 55t - 4.9t^2.$$

★ USE FORMULA $55x - 4.9x^2 - 152.5$ WITH $x = 5.1, 5.02, 5.004, 5.0008$
 $x - 5$

- [a] [FILL IN THE TABLE] Find the average velocity for the time period beginning when
- $t = 5$
- and lasting

	time period lasting			
	0.1 second	0.02 second	0.004 second	0.0008 second
average velocity	5.51 $\frac{1}{2}$	5.902 $\frac{1}{2}$	5.9804 $\frac{1}{2}$	5.9961 $\frac{1}{2}$
	rounded to 4 decimal places			

- [b] [FILL IN THE BLANK] The instantaneous velocity at
- $t = 5$
- is
- 6.1
- .

The point $P(4, 2)$ lies on the curve $y = \frac{\sqrt{x}}{x-3}$.★ USE FORMULA
 $\frac{\frac{\sqrt{x}}{x-3} - 2}{x-4}$

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- [a] [FILL IN THE TABLE] If
- Q
- is the point
- $\left(x, \frac{\sqrt{x}}{x-3}\right)$
- , find the slope of the secant line
- PQ
- for the following values of
- x
- :

	$x = 4.2$ $\frac{1}{2}$	$x = 4.02$ $\frac{1}{2}$	$x = 4.002$ $\frac{1}{2}$	$x = 3.8$ $\frac{1}{2}$	$x = 3.98$ $\frac{1}{2}$	$x = 3.998$ $\frac{1}{2}$
slope of secant line	-1.461	-1.716	-1.747	-2.183	-1.785	-1.753
	rounded to 4 decimal places					

- [b] [FILL IN THE BLANK] The slope of the tangent line at
- P
- is
- 1.75
- .

- [c] [FILL IN THE BLANK] The equation of the tangent line at
- P
- (in point-slope form) is
- $y - 2 = -1.75(x - 4)$
- .

The table below shows the value of a function $y = f(x)$.

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x	0	4	8	12	16	20
$f(x)$	37	29	22	17	13	11

Estimate the slope of the tangent line at $P(4, 29)$ by averaging the slopes of two appropriate secant lines.

SHOW YOUR CALCULATIONS.

$$\frac{1}{2} \left(\frac{29-37}{4-0} \right) = -2$$

$$\frac{1}{2} \left(\frac{22-29}{8-4} \right) = -\frac{7}{4}$$

$$\frac{1}{2} \left(-2 + -\frac{7}{4} \right) = -\frac{15}{8} \text{ or } -1.875$$

EITHER ONE