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]

SCORE: ___ / 10 POINTS

If an arrow is fired upward with a velocity of 58 m/s, its height in meters t seconds later is given by

SCORE: ___ / 3 POINTS

$y = 58t - 4.9t^2$. ☆ USE FORMULA $\dfrac{58x - 4.9x^2 - 167.5}{x - 5}$ USING $x = 5.1,$ $5.02,$ $5.004,$ 5.0008

[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	(8.51) ½	(8.902) ½	(8.9804) ½	(8.9961) ½
	rounded to 4 decimal places			

[b] **[FILL IN THE BLANK]** The instantaneous velocity at $t = 5$ is ___ (9) ! ___ .

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

SCORE: ___ / 5 POINTS

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

	$x = 4.5$	$x = 4.05$	$x = 4.005$	$x = 3.5$	$x = 3.95$	$x = 3.995$
slope of secant line	(−1.172) ½	(−1.667) ½	(−1.741) ½	(−3.483) ½	(−1.841) ½	(−1.759) ½
	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 $y = f(x)$.

SCORE: ___ / 2 POINTS

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

Estimate the slope of the tangent line at $P(16, 13)$ by averaging the slopes of two **appropriate** secant lines.
SHOW YOUR CALCULATIONS.

$\dfrac{1}{2} \left(\dfrac{13 - 17}{16 - 12} \right) = (-1) \ \dfrac{1}{4}$

$\dfrac{1}{2} \left(\dfrac{11 - 13}{20 - 16} \right) = \left(-\dfrac{1}{2} \right) \dfrac{1}{4}$

$\dfrac{1}{2} \left(-1 + -\dfrac{1}{2} \right) = \left(-\dfrac{3}{4} \right)$ OR (-0.75) ¼ ¼

EITHER ONE