

SCORE: ____ / 20 POINTS

Some values for a function f are given in the table below.

SCORE: ____ / 3 POINTS

Estimate the slope of the tangent line to $y = f(x)$ at $x = 7$ by averaging the slope of 2 appropriate secant lines.

Show the calculations that lead to your answers.

x	1	3	5	7	9	11
$f(x)$	-2	2	6	4	12	8

$$\frac{4-6}{7-5} = -1 \quad \frac{12-4}{9-7} = 4$$

$$\frac{-1+4}{2} = \frac{3}{2}$$

The position of an object travelling along a straight line is given by $s(t) = t^3 - 2t$.

SCORE: ____ / 3 POINTS

Find the average velocity of the object for the time period beginning when $t = 2$ and lasting 0.1 second.

Show the calculations that lead to your answers.

$$\frac{s(2.1) - s(2)}{2.1 - 2} = \frac{5.061 - 4}{.1} = 10.61$$

Sketch the graph of a function f such that

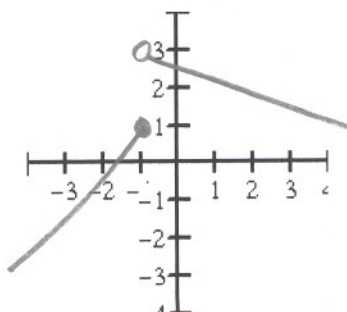
SCORE: ____ / 3 POINTS

$f(-1)$ exists,

$\lim_{x \rightarrow -1^-} f(x)$ exists,

$\lim_{x \rightarrow -1^+} f(x)$ exists and

$\lim_{x \rightarrow -1} f(x)$ does not exist.



The point $P(3, 2)$ lies on the curve $y = \sqrt{x^2 - 5}$.

$$\frac{\sqrt{x^2 - 5} - 2}{x - 3}$$

SCORE: ___ / 7 POINTS

- (a) If Q is the point $(x, \sqrt{x^2 - 5})$, use your calculator to find the slope of the secant line PQ (correct to three decimal places) for the following values of x :

x	2.5	2.9	2.99	2.999	3.001	3.01	3.1	3.5
slope of secant line	1.764	1.534	1.503	1.500	1.500	1.497	1.471	1.385

- (b) Using the results of part (a), guess the value of the slope of the tangent line to the curve at $P(3, 2)$.

$$1.5 \text{ or } \frac{3}{2}$$

- (c) Using the slope from part (b), find an equation of the tangent line to the curve at $P(3, 2)$.

$$y - 2 = \frac{3}{2}(x - 3)$$

OR

$$y = 2 + \frac{3}{2}(x - 3) \text{ or } y = \frac{3}{2}x - \frac{5}{2}$$

The graph of a function f is shown on the right. State the values of the following expressions, if they exist. Write DNE where appropriate.

SCORE: ___ / 4 POINTS

[a] $\lim_{x \rightarrow 4} f(x)$ 2

[b] $f(4)$ DNE

[c] $\lim_{x \rightarrow -2} f(x)$ 1

[d] $f(-2)$ 2

[e] $\lim_{x \rightarrow 3} f(x)$ 0

[f] $\lim_{x \rightarrow 2^+} f(x)$ -2

[g] $\lim_{x \rightarrow 2} f(x)$ DNE

[h] $f(2)$ 3

