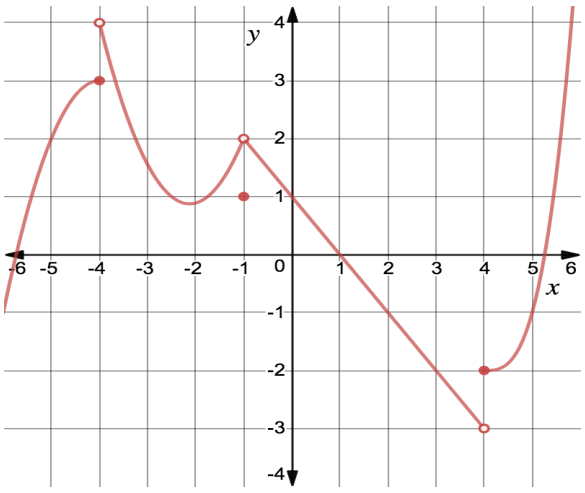
Names: _____ Group #: _____

1. Find the average rate of change of the following functions over the given interval:

   (a) $f(x) = 2x^2 - 3x + 7$; $[-2, 1]$

   (b) $g(t) = 2\cos^2(t)$; $\left[0, \frac{\pi}{6}\right]$

2. For the graph of $f(x)$ given below, find the following values, if they exist. If it does not exist, state "DNE".



   (a) $f(-1)$

   (b) $\lim_{x \to -1} f(x)$

   (c) $f(4)$

   (d) $\lim_{x \to 4^+} f(x)$

   (e) $\lim_{x \to 4^-} f(x)$

   (f) $\lim_{x \to 4} f(x)$

   (g) $\lim_{x \to -4^-} f(x)$

   (h) $\lim_{x \to -4} f(x)$

   (i) $\lim_{x \to -5} f(x)$

3. If a rock is thrown upward on the planet Mars with a velocity of 10 m/s, its height in meters t seconds later is given by $s(t) = 10t - 2t^2$.

   (a) Find the average velocity of the rock over the given time intervals:

   i. $[1, 1.1]$

   ii. $[1, 1.01]$

   iii. $[1, 1.001]$

   iv. $[1, 1.0001]$

   (b) Estimate the instantaneous velocity when $t = 1$.

4. Complete the table given below for $f(x) = \dfrac{x^2 - 1}{x - 1}$, then make a conclusion on the given limits.

x	0.9	0.99	0.999	1.001	1.01	1.1
$f(x)$						

   (a) $\lim\limits_{x \to 1^-} \dfrac{x^2 - 1}{x - 1}$

   (b) $\lim\limits_{x \to 1^+} \dfrac{x^2 - 1}{x - 1}$

   (c) $\lim\limits_{x \to 1} \dfrac{x^2 - 1}{x - 1}$

   (d) Why can't we just find $f(1)$ to determine $\lim\limits_{x \to 1} f(x)$?