

MATH 113 – QUIZ 1 – 4 SEPTEMBER 2012

Answer all of the following questions in the space provided. Show all work as partial credit may be given. Answers without justification, even if they are correct, will earn no credit.

1. (4 pts.) Consider the position function given by $s(t) = t^2 - t$. Complete the following table with the appropriate average velocities, then make a conjecture about the value of the instantaneous velocity at $t = 1$.

Time Interval	[1, 2]	[1, 1.5]	[1, 1.1]
Average Velocity	$\frac{s(2) - s(1)}{2 - 1}$ $= \frac{2 - 0}{1} = 2$	$\frac{s(1.5) - s(1)}{1.5 - 1}$ $= 1.5$	$\frac{s(1.1) - s(1)}{1.1 - 1}$ $= 1.1$

Guess: $\lim_{t \rightarrow 1} \frac{s(t) - s(1)}{t - 1} = 1$

2. (2 pts. each) Use the graph of $f(x)$ to find the following.

(a) $\lim_{x \rightarrow -1^+} f(x) = 2$

(b) $\lim_{x \rightarrow -1^-} f(x) = 2$

(c) $f(-1) = 3$

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Answer all of the following questions in the space provided. Show all work as partial credit may be given. Answers without justification, even if they are correct, will earn no credit.

1. (4 pts.) Consider the position function given by $s(t) = 2t^3$. Complete the following table with the appropriate average velocities, then make a conjecture about the value of the instantaneous velocity at $t = 2$.

Time Interval	[1, 2]	[1.5, 2]	[1.9, 2]
Average Velocity	$\frac{s(2) - s(1)}{2 - 1}$ $= 14$	$\frac{s(2) - s(1.5)}{2 - 1.5}$ $= 18.5$	$\frac{s(2) - s(1.9)}{2 - 1.9}$ $= 22.82$

Guess: $\lim_{t \rightarrow 2} \frac{s(2) - s(t)}{2 - t} = 23$

Actual answer:
24

2. (2 pts. each) Use the graph of $f(x)$ to find the following.

(a) $\lim_{x \rightarrow 1^+} f(x) = 5$

(b) $\lim_{x \rightarrow 1^-} f(x) = 4$

(c) $f(1) = 2$

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Answer all of the following questions in the space provided. Show all work as partial credit may be given. Answers without justification, even if they are correct, will earn no credit.

1. (4 pts.) Consider the position function given by $s(t) = -2t^2 + 6t$. Complete the following table with the appropriate average velocities, then make a conjecture about the value of the instantaneous velocity at $t = 3$.

Time Interval	[2, 3]	[2.5, 3]	[2.9, 3]
Average Velocity	$\frac{s(3) - s(2)}{3 - 2}$ $= -4$	$\frac{s(3) - s(2.5)}{3 - 2.5}$ $= -5$	$\frac{s(3) - s(2.9)}{3 - 2.9}$ $= -5.8$

Guess: $\lim_{t \rightarrow 3} \frac{s(3) - s(t)}{3 - t} = -6$

2. (2 pts. each) Use the graph of $f(x)$ to find the following.

(a) $\lim_{x \rightarrow 3^+} f(x) = 4$

(b) $\lim_{x \rightarrow 3^-} f(x) = 4$

(c) $f(3) = 4$

