Quiz 1

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Question 1:

The graph gives the position s(t) of an object moving along a line at time t, over a 2.5 second interval. Find the average velocity of the object over the following intervals.

a.) [0.5, 2.5]

Solution:

if Average Velocity $= \frac{\text{change in height}}{\text{change in time}}$

Then at the interval **[0.5, 2.5]** we would have an average velocity of:

$$\begin{aligned} &\frac{150-46}{2.5-0.5} \\ &= 52. \end{aligned}$$

b.) [0.5, 2]

Solution:

$$\begin{aligned} &\frac{136-46}{2-0.5} \\ &= 60. \end{aligned}$$

c.) [0.5, 1.5]

Solution:

$$\begin{aligned} &\frac{114-46}{1.5-0.5} \\ &= 68. \end{aligned}$$

d.) [0.5, 1]

Solution:

$$\begin{aligned} &\frac{84-46}{1-0.5} \\ &= 76. \end{aligned}$$

Question 2:

Evaluate each of the following limits. No work to be shown.

a.) $\lim_{x \to 4+} g(x) = \mathbf{2}$

b.) $\lim_{x \to 4-} g(x) = \mathbf{0}$

c.) $\lim_{x \to 2} g(x) = \mathbf{DNE}$

d.) $\lim_{x \to 6} g(x) = \mathbf{1}$

Question 3:

Evaluate the limit. Show your work. Use limit notation when necessary.

$$\lim_{x \to 9} \frac{9-x}{3-\sqrt{x}}.$$

Solution: 😃

If we plug 9 into the denomonator, we get an output of 0. Therefore 9 is not in the domain of this function and we must use **Direct Substitution Property.**

If we multiply the numerator and denomonator by $3+\sqrt{x}$, we get:

$$\lim_{x \to 9} \frac{(9-x)(3+\sqrt{x})}{(3-\sqrt{x})(3+\sqrt{x})}.$$

If we simplify the denomonator we get:

$$\lim_{x \to 9} \frac{(9-x)(3+\sqrt{x})}{9-x}.$$

Now we can cancel out the common term (9-x) and we are left with:

$$\lim_{x \to 9} 3+\sqrt{x}.$$

Now we just plug 9 into this new equation and output our answer

$$3+\sqrt{9}$$
$$=6.$$

Therefore:

$$\lim_{x \to 9} \frac{9-x}{3-\sqrt{x}} = 6.$$