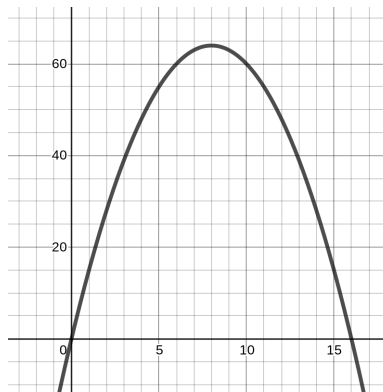


**Directions:**

- Do only the problems that you need to take and feel ready to take. If you have already earned Mastery on a Learning Target, do not attempt a problem for that Target! You can skip a Target if you need more time to practice with it, and take it on the next round.
- Each Learning Target problem is to be written up on a separate sheet, scanned to separate PDF files, and submitted to the appropriate Learning Target “assignment” on Blackboard. **Please do not submit more than one Learning Target in the same PDF, and make sure you are submitting it to the right Blackboard area.**
- If you are handwriting, submit your work by **scanning your work** using a scanning app or scanning device; **do not just take a picture** but scan your work to a clear, legible, black and white PDF file of size less than 100 MB. **Work submitted as an image file (JPG, PNG, etc.) will not be graded.**
- Please consult the grading criteria found in the [Information on Learning Targets and Checkpoints](#) document found in the *Learning Targets* area on Blackboard prior to submitting your work, to make sure your submission has met all the requirements.
- Please use the [approved resources](#) to double-check your work against errors prior to submitting your work.

**Learning Target 1:** *I can find the average rate of change of a function and the average velocity of an object on an interval.*

1. Let  $f(x) = 4 - \sqrt{x}$ . Find the average rate of change in  $f$  on the intervals  $[1, 9]$  and  $[2, 2.01]$ . If you round, round your decimals to four places.
2. Let  $g(x)$  be the graph shown below. Find the average rate of change in  $g$  on the intervals  $[1, 5]$  and  $[5, 16]$ .



3. A car is moving down a straight racetrack, and its distance  $s$  (in feet) from an observation booth on the track at time  $t$  seconds is given by the following table:

Time	0	15	30	45	60
Distance	10	90	200	450	550

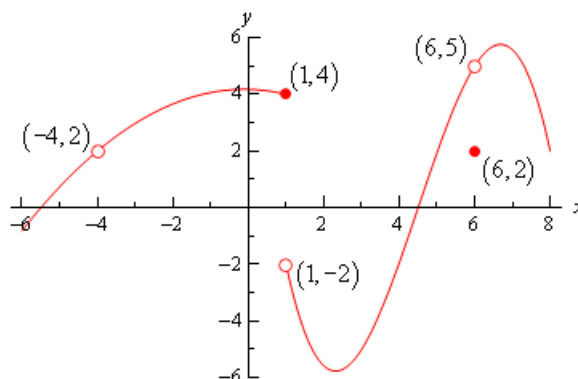
Find the student's average velocity from  $t = 0$  to  $t = 15$  and from  $t = 30$  to  $t = 60$ .

**Learning Target 2 (Core):** *I can find one- and two-sided limits of a function at a point and at infinity using numerical, graphical, and algebraic methods.*

1. Complete the table of values below using the function  $f(x) = \frac{\sqrt{9+x}-3}{x}$ . Then state the value of  $\lim_{x \rightarrow 5} f(x)$  and explain your reasoning. You do not need to show your work on computing the table values, but they must all be correct.

$x$	-0.5	-0.1	-0.01	0.01	0.1	0.5
$f(x)$						

2. Using only algebra (no graphs or tables), evaluate  $\lim_{y \rightarrow 7} \frac{y^2 - 4y - 21}{3y^2 - 17y - 28}$ .
3. The function  $h(x)$  is shown below. State the value of each limit shown below the graph. If the limit doesn't exist, write "does not exist" and then explain why.



- (a)  $\lim_{x \rightarrow 1} h(x)$   
 (b)  $\lim_{x \rightarrow 1^+} h(x)$   
 (c)  $\lim_{x \rightarrow 6} h(x)$   
 (d)  $\lim_{x \rightarrow -4} h(x)$

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**Learning Target 3:** *I can find the derivative of a function (both at a point and as a function) and the instantaneous velocity of an object using the definition of the derivative.*

Consider the function  $f(x) = 3x^2 - 5x + 1$ .

- Write out the correct limit expression that would compute  $f'(2)$ .
- Find the exact value of  $f'(2)$  by computing the limit from part (a), using algebraic techniques.

**Note:** Your solution *must* begin with a correct statement of the limit. Your solution *can only* be found by evaluating the limit; no "shortcut" methods from later parts of this course are allowed (except in your notes to check your answer). *All significant algebra steps* must be shown and done correctly.