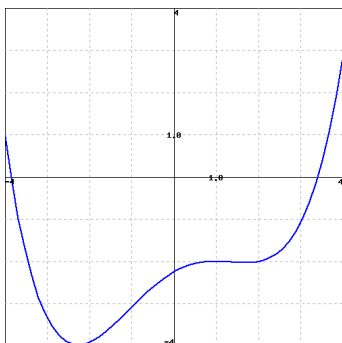


1. (2 pts) Consider the function  $f(x)$  shown in the graph below.



(Note that you can click on the graph to get a larger version of it, and that it may be useful to print that larger version to be able to work with it by hand.)

Carefully sketch the derivative function of the given function (you will want to estimate values on the derivative function at different  $x$  values as you do this). Use your derivative function graph to estimate the following values on the derivative function.

at $x =$	-3	-1	1	3
the derivative is	___	___	___	___

Answer(s) submitted:

•  
•  
•  
•

(incorrect)

2. (2 pts) Suppose that  $f$  is given for  $x$  in the interval  $[0, 12]$  by

$x =$	0	2	4	6	8	10	12
$f(x) =$	-18	-16	-12	-11	-12	-16	-18

A. Estimate  $f'(2)$  using the values of  $f$  in the table.

$f'(2) \approx$  \_\_\_

B. For what values of  $x$  does  $f'(x)$  appear to be positive?

(Give your answer as an interval or a list of intervals, e.g.,  $(-\infty, 8]$  or  $(1, 5), (7, 10)$ .)

C. For what values of  $x$  does  $f'(x)$  appear to be negative?

(Give your answer as an interval or a list of intervals, e.g.,  $(-\infty, 8]$  or  $(1, 5), (7, 10)$ .)

Answer(s) submitted:

•  
•  
•

(incorrect)

3. (2 pts) Find a formula for the derivative of the function  $g(x) = 5x^2 - 6$  using difference quotients:

$$g'(x) = \lim_{h \rightarrow 0} [(\text{_____})/h]$$

$$= \text{_____}.$$

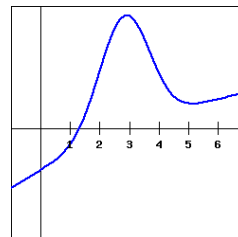
(In the first answer blank, fill in the numerator of the difference quotient you use to evaluate the integral. In the second, fill out the derivative you obtain after completing the calculation.)

Answer(s) submitted:

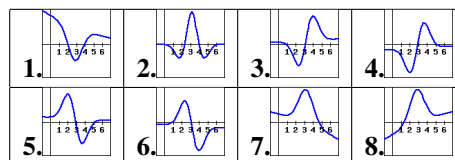
•  
•

(incorrect)

4. (1 pt) For the function  $f(x)$  shown in the graph below, sketch a graph of the derivative. You will then be picking which of the following is the correct derivative graph, but should be sure to first sketch the derivative yourself.



Which of the following graphs is the derivative of  $f(x)$ ?  ?  
(Click on a graph to enlarge it.)



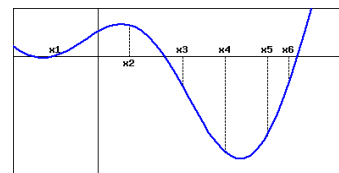
Answer(s) submitted:

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(incorrect)

5. (2 pts)

The graph of a function  $f$  is shown below.



At which of the labeled  $x$ -values is  $f(x)$  least?  $x = \boxed{?}$

$f(x)$  greatest?  $x = \boxed{?}$

$f'(x)$  least?  $x = \boxed{?}$

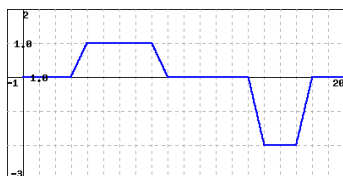
$f'(x)$  greatest?  $x = \boxed{?}$

Answer(s) submitted:

- 
- 
- 
- 

(incorrect)

6. (2 pts) A child inflates a balloon, admires it for a while and then lets the air out at a constant rate. If  $V(t)$  gives the volume of the balloon at time  $t$ , then the figure below shows  $V'(t)$  as a function of  $t$ .



At what time does the child:

A. Begin to inflate the balloon?  $t = \underline{\hspace{2cm}}$

B. Finish inflating the balloon?  $t = \underline{\hspace{2cm}}$

C. Begin to let the air out?  $t = \underline{\hspace{2cm}}$

(What would the graph of  $V'(t)$  look like if the child had alternated between pinching and releasing the open end of the balloon, instead of letting the air out at constant rate?)

Answer(s) submitted:

- 
- 
- 

(incorrect)

7. (3 pts) Let  $f(x) = -7 - 3x^2$ . Then the expression

$$\frac{f(x+h) - f(x)}{h}$$

can be written in the form  $Ah + Bx + C$ , where  $A$ ,  $B$ , and  $C$  are constants. (Note: It's possible for one or more of these constants to be 0.) Find the constants.

$A = \underline{\hspace{2cm}}$

$B = \underline{\hspace{2cm}}$

$C = \underline{\hspace{2cm}}$

Use your answer from above to find  $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ .

$$\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} = \underline{\hspace{2cm}}$$

Finally, find each of the following:

$$f'(1) = \underline{\hspace{2cm}}$$

$$f'(2) = \underline{\hspace{2cm}}$$

$$f'(3) = \underline{\hspace{2cm}}$$

Answer(s) submitted:

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- 

(incorrect)

8. (2 pts)

Let

$$f(x) = \frac{1}{x+5}$$

Find

$$(i) f'(-6) \underline{\hspace{2cm}}$$

$$(ii) f'(-4) \underline{\hspace{2cm}}$$

$$(iii) f'(-3) \underline{\hspace{2cm}}$$

$$(iv) f'(-1) \underline{\hspace{2cm}}$$

Answer(s) submitted:

- 
- 
- 
- 

(incorrect)