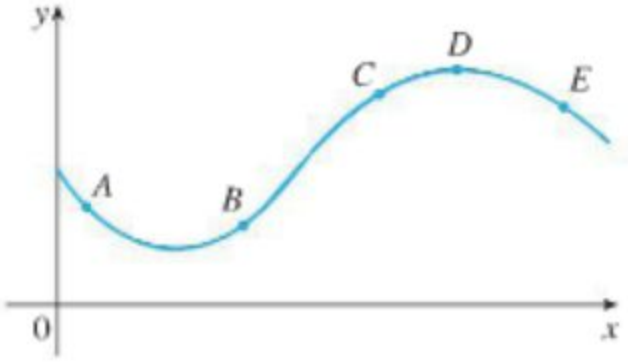
Calculus Chapter 3 Practice Assessment

1. Using the graph of $f(x)$ at right, arrange the following values in ascending order.



   a. $f'(B)$

   b. The slope of AC

   c. $f'(D)$

   d. The slope of CE

   e. $f'(E)$

   f. The slope of DE

   g. The number 1

2. What does each of the following situations indicate about the graph of the function?

   a. As x increases, $f(x)$ changes from positive to negative.

   b. As x increases, $f'(x)$ changes from positive to negative.

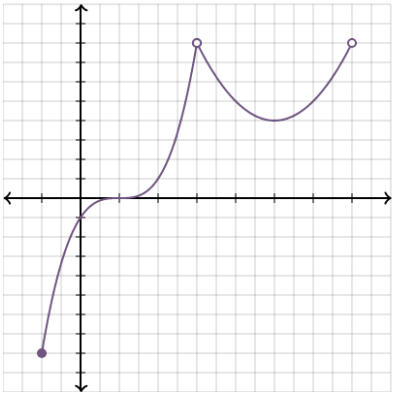
   c. As x increases, $f''(x)$ changes from positive to negative.

3. Find the first and second derivatives of the following functions:

   a. $f(x) = \frac{1}{(x+3)^3} + .5x^2 - 8x^6$

   b. $f(x) = -3cos(x) + \sqrt[3]{x^4} - 3e$

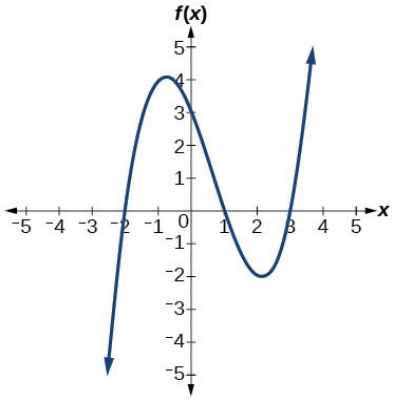
4. Use the graph at the right to answer the following questions (Use interval notation):
   a. Where is $f(x)$ increasing?
   b. Where is $f'(x) < 0$
   c. Where is $f''(x) > 0$
   d. Where is $f'(x) = 0$
   e. Where is $f''(x) = 0$?
   f. Where is $f(x)$ continuous, but not differentiable?

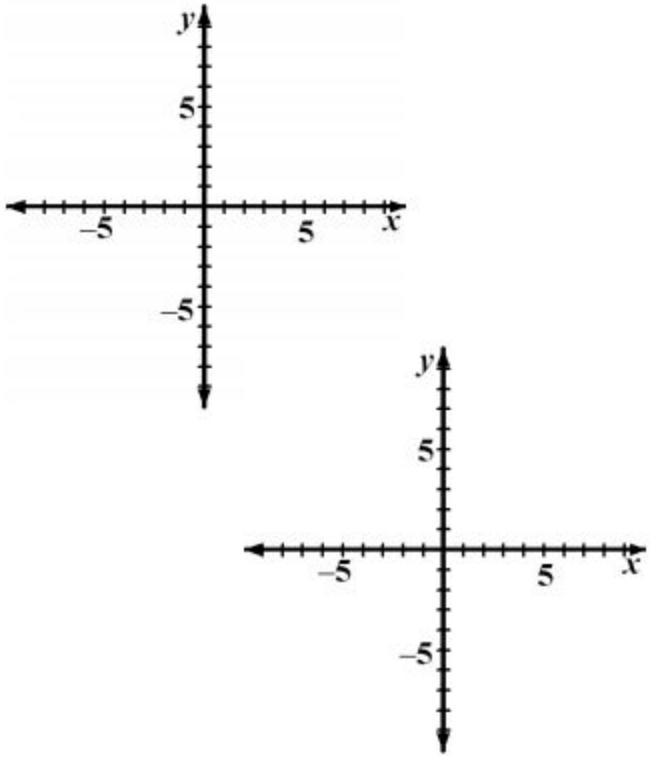


5. Find the values of *a* and *b* such that $g(x)$ is a continuous function.

$$x + 7, \text{ for } x \leq -1$$
$$a(x+1)^2 + b, \text{ for } -1 < x \leq 2$$
$$\sqrt{x+2}, \text{ for } x \geq 2$$

6. The graph below is $f(x)$
   Use it to draw $f'(x)$ and $f''(x)$





7. Find each derivative algebraically.
   a. $f(x) = (4x^2 + 7x)(2x^3 - 2)$
   b. $f(x) = 3x^{2/3} + \frac{1}{4x^{1/4}}$
   c. $\lim_{h \to 0} \frac{3(x+h)^2+4(x+h)-7-3x^2-4x+7}{h}$
   d. $f(x) = \sqrt[8]{x^3} + \sqrt[5]{x^7}$

8. The height (in meters) of a rocket at a time t (in seconds) is given by the following equation: $s(t) = -16t^2 + 128t + 10$
   a. What is the velocity of the rocket when $t = 3$ seconds?
   b. When is the velocity of the rocket 0?
   c. What is the acceleration of the ball when $t = 5\ seconds$?
   d. When is the acceleration of the rocket 0?

9. Find the general antiderivative of the following:
   a. $f(x) = 2x^5 + 3x^3 - 5x^2 + 8$
   b. $f(x) = x^{2/3} - 2x^{5/2} - 2$

10. The graph at the right is $f'(x)$.

a. Where is $f(x)$ increasing?

b. Where is $f(x)$ concave up and concave down?