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|---------|----|----|----|---|----|
| x | -4 | -1 | 1 | 3 | 6 |
| $k(x)$ | 3 | 0 | -2 | 4 | 7 |
| $k'(x)$ | -5 | 2 | 3 | 6 | -4 |

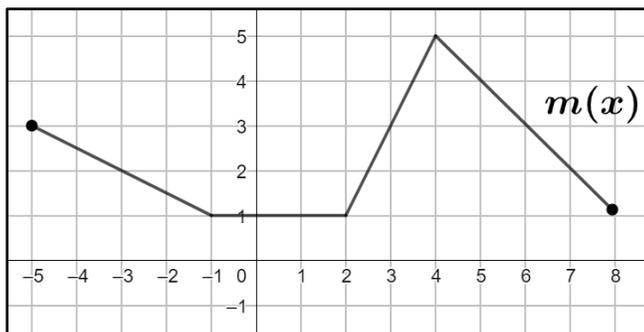
$$f(x) = x^2 - 2x + 4$$

$$g(x) = 2 \sin(x) + 4 \cos(x)$$

$$h(x) = e^x - \frac{2}{x} + ex - 2e$$

Directions: The functions f , g , and h are defined above along with the graph of m and a table of selected values for the differentiable functions k and k' . Use this information to find the following.

- Find the average rate of change of $k(x)$ on the interval $[-4, 6]$.
- Approximate $k'(2)$.
- Find the instantaneous rate of change of k at $x = 3$.
- Write an equation of the line tangent to k at $x = 1$.
- Find the instantaneous rate of change of g at $x = \frac{\pi}{6}$.
- Find the instantaneous rate of change of m at $x = \pi$.
- Is there a time c , where $-4 < c < 6$, such that $k(c) = 5$? Give a reason for your answer.
- Is there a time c , where $-4 < c < -1$, such that $k'(c) = -4$? Give a reason for your answer.



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9. Find the average rate of change of $f(x)$ on the interval $[-1, 2]$.

10. Find the average rate of change of $m(x)$ on the interval $[-3, 7]$.

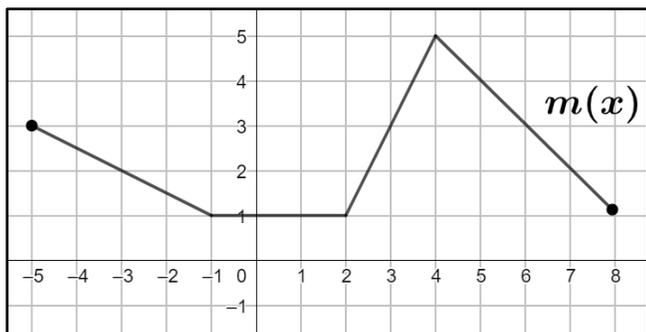
11. Let $p(x) = 2m(x) - x^3$. Find $p'(-3)$.

12. Find $h'(x)$.

13. Let $q(x) = m(x)k(x)$. Find $q'(1)$.

14. Let $r(x) = \frac{f(x)}{k(x)}$. Find $r'(3)$.

15. Find the slope of the line tangent to the graph of m at $x = -4$.



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16. For which values of x on the open interval $(-5, 8)$ is $m(x)$ not differentiable?

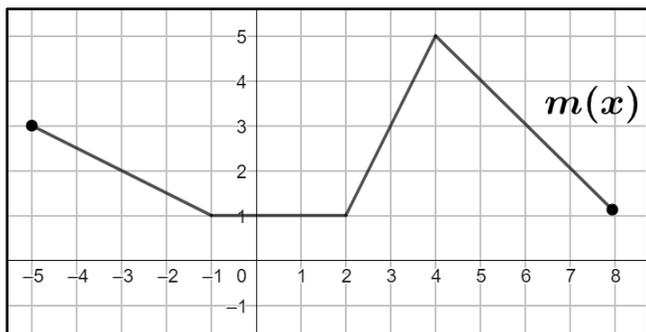
17. Write an equation for the line tangent to h at $x = 1$.

18. Let $w(x) = \frac{m(x)}{2x}$. Find $w'(-3)$.

19. Let $L(x) = 3f(x) + \frac{k(x)}{2}$. Find $L'(3)$.

20. Let $s(x) = f(x)\sqrt{x}$. Find $s'(4)$.

21. Find the slope of the line tangent to the graph of g at $x = \frac{\pi}{4}$.



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22. For which value of x in $[-4, 6]$ is the instantaneous rate of change of $k(x)$ equal to the average rate of change of $k(x)$ on the interval $[1, 3]$?

23. Let $n(x) = \frac{k(x)}{3x + 1}$. Find $n'(-1)$.

24. Let $y = \frac{x^2}{m(x)}$. Find $\frac{dy}{dx}\bigg|_{x=3}$.

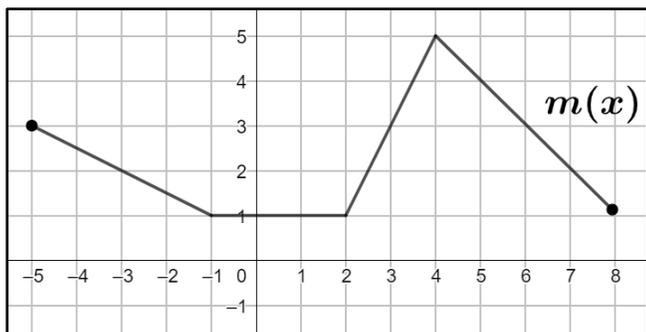
25. Let $D(x) = 4 \ln(x) k(x)$. Find $D'(1)$.

Directions: Order the following from least to greatest.

26. $m'(3), m(-2), m'(1)$

27. $m'(6), k'(6), f'(6)$

28. $g(0), g'(0), g''(0)$



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29. Let $N(x) = \frac{2}{\sqrt{x}} - f(x)$. Find $N'(x)$.

30. Find any value(s) of x where $f(x)$ has a horizontal tangent line.

31. Let $A(x) = 2k(x) + 3x$. For which value(s) of x does the line tangent to the graph of $A(x)$ have a slope of -5 ?

32. Let $B(x) = 6 \ln|x| - 5e^x + \frac{3}{x}$. Find the slope of the line tangent to the graph of B at $x = -1$.

33. Let $C(x) = 2x^3 - m(x)k(x)$. Find $C'(6)$.

34. Let $L(x) = \frac{k(x)}{k'(x)}$. If L has a horizontal tangent line at $x = 1$, find $k''(1)$.