

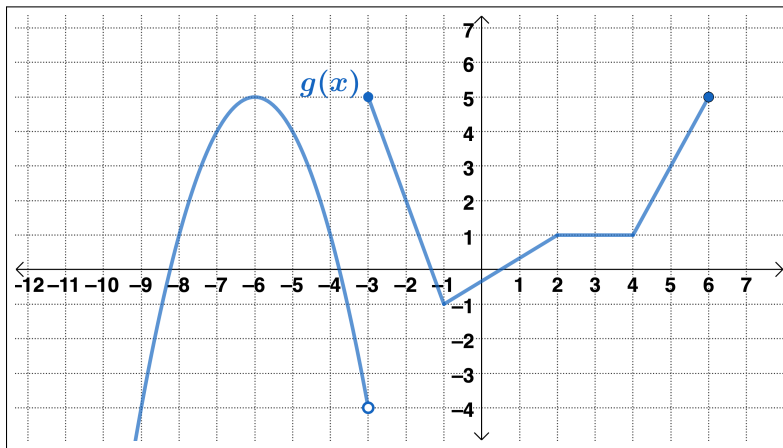


SESSION 4: SECTIONS 2-3 AND 2-4

- (1) Find $f'(t)$ given $f(t) = 2t^2 - 3t + 1$.
- (2) Given $y = \frac{5}{9t^6} + 6\sqrt[3]{t^2}$, find $\frac{dy}{dt}$.
- (3) Find $\frac{d}{dx} \left(\pi x^{2\pi} + \frac{5x^8}{\sqrt{x}} + \frac{3e}{\sqrt[6]{x^5}} \right)$.
- (4) Given $f(x) = 3e^x + 4\ln(x) - \frac{1}{2}\log_7(x)$, find $f'(x)$.
- (5) Find $\frac{dp}{dx}$ given $p = 10^x + x^7 + \log(x^5) + 10e^x$.
- (6) Find $f'(x)$ given $f(x) = \ln\left(\frac{x^2}{5}\right) + \log(2x)$.
- (7) If $h(x) = -4f(x) + 5g(x) - 9$, $f'(5) = 8$, and $g'(5) = 4$, find $h'(5)$.
- (8) If $f(x) = 3x^4 - 6x^2 - 7$, find the equation of the tangent line at $x = 2$.
- (9) Find the value(s) of x where the line(s) tangent to $h(x) = x^4 - 5x^2 + 4$ are horizontal.
- (10) The total profit (in dollars) from the sale of x skateboards is $P(x) = 30x - 0.3x^2 - 250$ for $0 \leq x \leq 100$.
 - (a) Find the exact profit from the sale of the 26th skateboard.
 - (b) Find the marginal profit function and then use it to approximate the profit from the sale of the 26th skateboard.
- (11) Find $f'(x)$ for the following functions.
 - (a) $f(x) = x^2 \ln(x)$
 - (b) $f(x) = \frac{4e^x}{7x^3 + 2x^2 + 5x}$
 - (c) $f(x) = \frac{\log_3(x^6)}{\sqrt{x} + \sqrt[5]{x^3}}$
 - (d) $f(x) = 5^x \left(\frac{\sqrt{x}}{\sqrt[3]{x^2}} \right)$
- (12) Find the x -value(s) where the graph of $f(x) = e^x(x^2 - 2x - 2)$ has a horizontal tangent line.
- (13) Find the x -value(s) where $f(x) = \frac{-20x}{x+2}$ has an instantaneous rate of change of -10 .

- (14) The company Incensitive makes prank bad smelling incense sticks. The daily revenue function of the company is given by $R(x) = 10x^2(0.878)^x$ dollars when x packages of incense sticks are sold.
- Find the company's marginal revenue function.
 - Find $R'(25)$ and interpret your answer.
 - Approximate the revenue from selling the 15th package of incense sticks.
 - Find the exact revenue from selling the 15th package of incense sticks.
 - How does the estimate of the revenue from selling the 15th package of incense sticks compare to the exact revenue from selling the 15th package of incense sticks?

- (15) Use the table and graph below to find each of the following.



x	$f(x)$	$f'(x)$
-6	4	10
-5	2	9
-4	0	10
-3	-4	6
-2	9	0
-1	3	-1
0	9	-4
1	8	0
2	7	4
3	3	5
4	1	7
5	-1	3

(a) $h'(-6)$ if $h(x) = x^2g(x)$

(b) $p'(-2)$ if $p(x) = \frac{f(x) + 4x}{g(x)}$

(c) $k'(5)$ if $k(x) = \frac{e^x g(x)}{f(x) + \ln(x)}$