

Practice Exercise
Week #2 (part 1)

The even-numbered problems are selected from the required textbook. The answers to these problems are given in a separate file. The link to the answers to next to the link to this file.

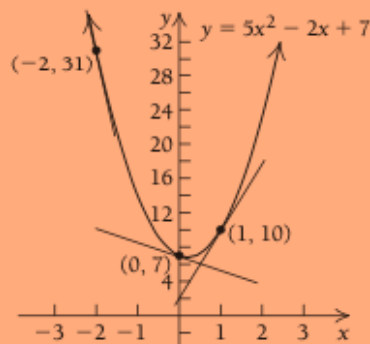
Section 1.4.

Complete the following parts for each given function

- Graph the function.
- Draw lines tangent to the graph at the points with x -coordinates -2 , 0 , and 1 .
- Find $f'(x)$ by determining $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$.
- Find $f'(-2)$, $f'(0)$, and $f'(1)$. These slopes should match those of the lines you drew in part (b).

14. $f(x) = 5x^2 - 2x + 7$

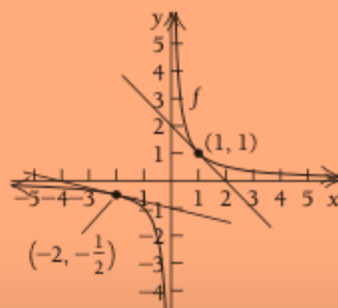
14. (a) and (b)



(c) $f'(x) = 10x - 2$;
(d) $-22, -2, 8$

16. $f(x) = \frac{1}{x}$

16. (a) and (b)



(c) $f'(x) = -\frac{1}{x^2}$;
(d) $-\frac{1}{4}$, not defined, -1

Find the equation of the tangent line based on given conditions

20. Find an equation of the line tangent to the graph of $f(x) = -1/x$ at (a) $(-1, 1)$; (b) $(2, -\frac{1}{2})$; (c) $(-5, \frac{1}{5})$.

20. (a) $y = x + 2$; (b) $y = \frac{1}{4}x - 1$; (c) $y = \frac{1}{25}x + \frac{2}{5}$

22. Find an equation of the line tangent to the graph of $f(x) = 4 - x^2$ at (a) $(-1, 3)$; (b) $(0, 4)$; (c) $(5, -21)$.

22. (a) $y = 2x + 5$; (b) $y = 4$; (c) $y = -10x + 29$

Find the derivative of the following functions

46. $f(x) = x^5$ 46. $f'(x) = 5x^4$

48. $f(x) = \sqrt{x}$ 48. $f'(x) = \frac{1}{2\sqrt{x}}$

50. $f(x) = \frac{1}{\sqrt{x}}$ 50. $f'(x) = -\frac{1}{2x\sqrt{x}}$

58. Let F be a function given by

$$F(x) = \begin{cases} x^2 + 1, & \text{for } x \leq 2, \\ 2x + 1, & \text{for } x > 2. \end{cases}$$

- a) Verify that F is continuous at $x = 2$.
b) Is F differentiable at $x = 2$? Why or why not?

58. (a) Limit is 5 and $F(2) = 5$, so F is continuous at $x = 2$.
(b) No, there is a corner at $x = 2$.

60. Let H be a function given by

$$H(x) = \begin{cases} 2x^2 - x, & \text{for } x \leq 3, \\ mx + b, & \text{for } x > 3. \end{cases}$$

Determine the values of m and b that make H differentiable at $x = 3$.

60. $m = 11, b = -18$

62. Let $f(x) = -x^3$ over $[0, 5]$. Find c such that $0 < c < 5$,

where $f'(c) = \frac{f(5) - f(0)}{5 - 0}$.

62. $\frac{5}{\sqrt{3}}$