

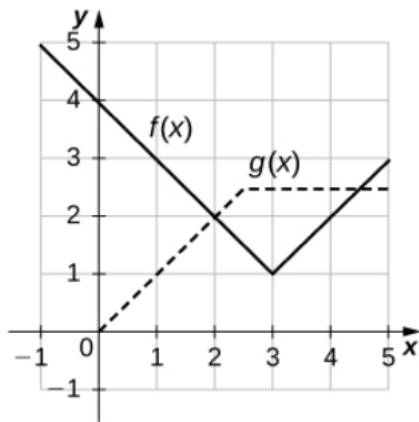
MATH 100, Tutorial 4

(Week of February 5, 2024)

(Pre-lab) For this week you need to:

- Do exercise 1-part (a) [1 pt] and exercise 3 [4 pts].

Exercise 1 Let $h(x) = \frac{f(x)}{g(x)}$, where f and g are the functions graphed in the adjacent figure. In each of the following cases, find (if the quantity exists)



- (a) $h'(1)$,
- (b) $h'(3)$, and
- (c) $h'(4)$.

Exercise 2 Find the point on the graph of $f(x) = x^3$ such that the tangent line at that point has an x intercept of 6.

Exercise 3 Find the equation of the line passing through the point $P(3, 3)$ and tangent to the graph of $f(x) = \frac{6}{x-1}$.

Exercise 4 Find a quadratic polynomial such that $f(1) = 5$, $f'(1) = 3$ and $f''(1) = -6$.

Exercise 5 In each of the following cases, decompose each function in the form $y = f(u)$ and $u = g(x)$, and then find $\frac{dy}{dx}$ as a function of x .

(i) $y = \sqrt{4(x^2 - 6x) + 3}$

(ii) $y = (8x^2 + 5)^3$

(iii) $y = \left(\frac{x}{8} + \frac{8}{x}\right)^8$.

Exercise 6 Let $y = (f(x) + 5x^2)^4$ and suppose that $f(-1) = -4$ and $\frac{dy}{dx} = 3$ when $x = -1$. Find $f'(-1)$.