

**The Derivative of a Function - Day 7**

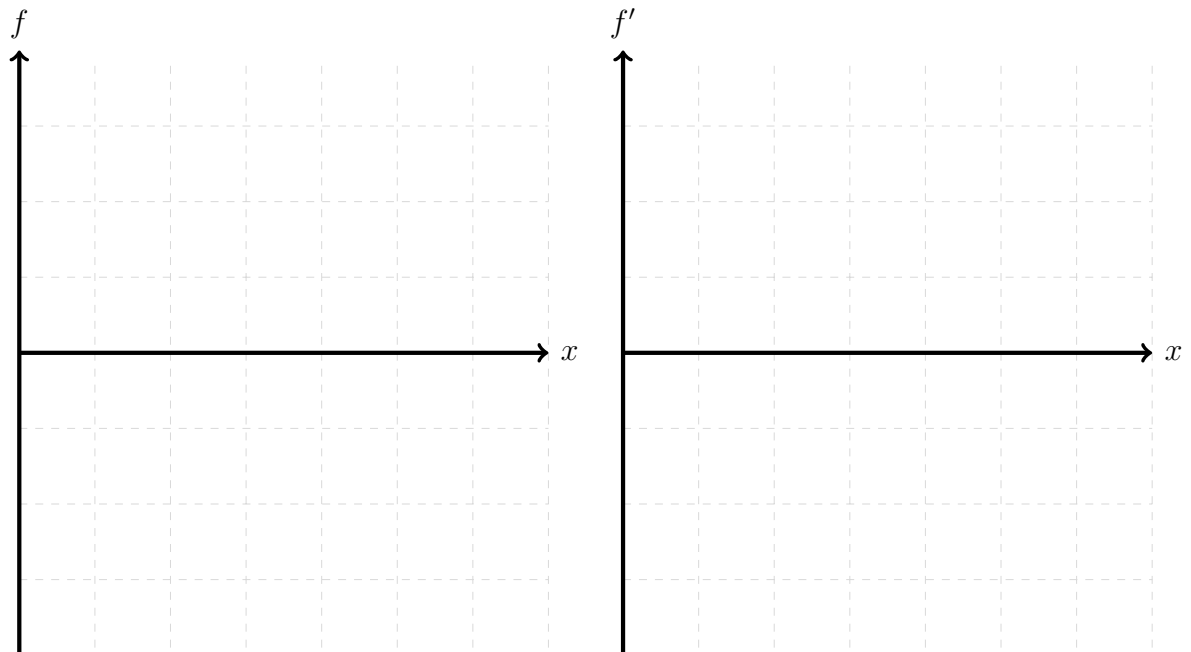
1. Let  $f(x) = 3x - x^2$ .

(a) Use the definition of derivative to find  $f'(2)$ .

(b) Use the definition of derivative to find  $f'(x)$  for an arbitrary value of  $x$ .

(c) On the left below, sketch a graph of the function  $f(x)$  for  $0 \leq x \leq 4$ .

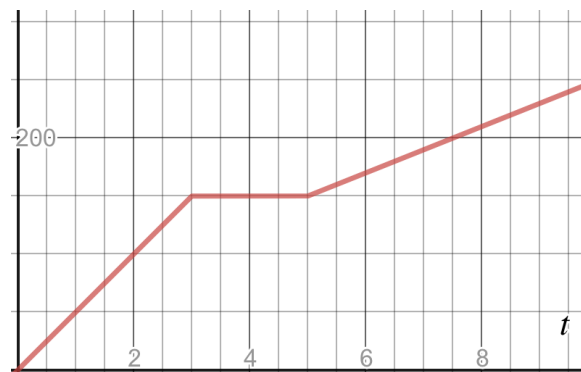
(d) On the right below, sketch a graph of its derivative  $f'(x)$  for  $0 \leq x \leq 4$ .



- (e) Explain why the graph on the right makes sense as the derivative of the graph on the left by checking that the derivative is positive, negative, and zero in the right places.

2. Elyse is walking to a friend's house. Her distance from home (in yards) after  $t$  minutes is given by the following graph:

- (a) Find Elyse's velocity at  $t = 2$ , including units.



- (b) Sketch a graph of Elyse's velocity in terms of time. (*It should be a piecewise constant function.*)

- (c) Write a formula for Elyse's velocity,  $v(t) = \begin{cases} \dots\dots\dots & \text{for } \dots\dots\dots \\ \dots\dots\dots & \text{for } \dots\dots\dots \\ \dots\dots\dots & \text{for } \dots\dots\dots \end{cases}$

- (d) Write a possible explanation of Elyse's walk.