Activity 1.3 – Derivatives of Linear Functions

1. (a) $f'(x) = 0$

   (b) $g'(x) = 0$

   (c) $h'(x) = 0$

   (d) $F'(x) = m$

   (e) $G'(x) = 9$

   (f) $H'(x) = -1$

2. (a) $v(t) = s'(t) = -2$ ft/s

   (b) $v(10) = -2$ ft/s

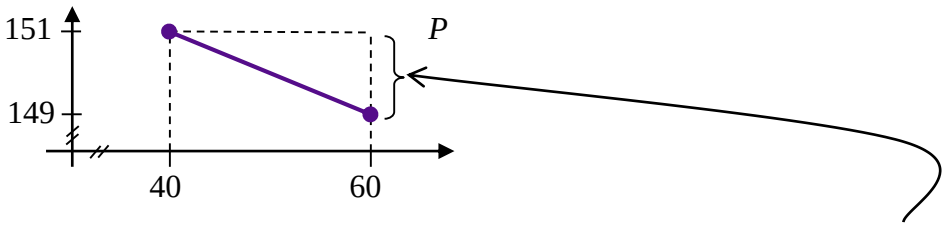
   (c) $a(t) = v'(t) = 0$ ft/s^2

3. (a) The given point is (1, 22) and the slope is –0.4. Therefore, $H - 22 = -0.4(t - 1)$, so $H(t) = -0.4t + 22.4$ ft^3.

   (b) $H(5) = -0.4(5) + 22.4 = 20.4$ ft^3

4. (a) The given point is (50, 150) and the slope –0.1. Therefore, $P - 150 = -0.1(x - 50)$, so $P(x) = -0.1x + 155$ dollars, where $40 \le x \le 60$ is the number of shirts sold.

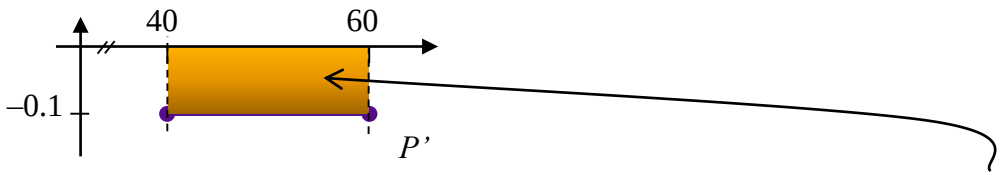
   (b)



   (c) The net change in P is $P(60) - P(40)$ = (149 dollars) – (151 dollars) = –2 dollars. The negative shows a decrease in profit.

   (d) $P'(x) = -0.1$ dollars per shirt.

   (e)



   (f) Net area bounded by P' = length × height = (20 shirts) × (–0.1 dollars/shirt) = –2 dollars

   (g) The answers are the same! This result is called the Fundamental Theorem of Calculus…