Activity 1.2 – Linear Functions

1. (a) $y - 5 = 2(x - 4)$ or $f(x) - 5 = 2(x - 4)$

   (b) $y = 2x - 3$ or $f(x) = 2x - 3$

   (c) $x = 3/2$

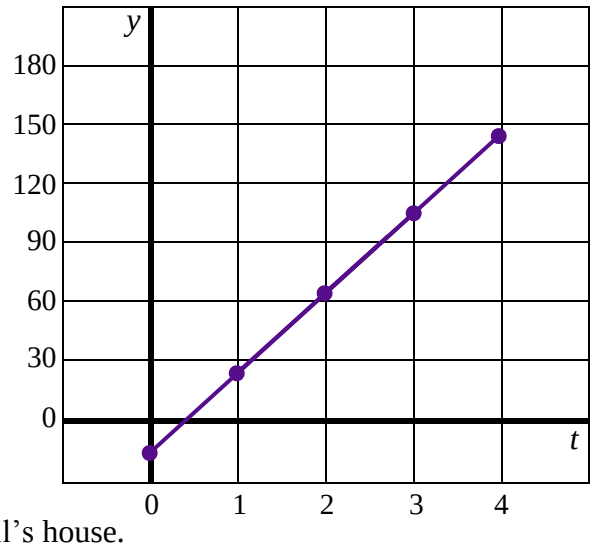
2. (a) Between 1915 and 1920, the population changed by $3100 - 3250 = -150$ people, and changed at a rate of $\dfrac{3100 - 3250}{1920 - 1915} = -30$ people per year. The negative answers represent a decrease in population.

   (b) $P(t) = -30t + 3250$ people, where t is years after 1915.

   (c) $P(10) = -30(10) + 3250 = 2950$ people at the end of 1925.

3. (a)

Time t	Position s
0	–15
1	25
2	65
3	105
4	145



   (b) $y = s(t) = 40t - 15$ miles from Bill's house.

   (c) Set $40t - 15 = 0$ to get $40t = 15$, or $t = 15/40 = 0.375$. This is the time at which the position from Bill's house is zero. That is, they pass Bill's house after 0.375 hours.

   (d) Since $s(0) = -15$, we can conclude that the initial position was 15 miles west of Bill's.

   (e) $s'(t) = 40$ miles per hour (eastward)

4. (a) $y = s(t) = 40t + C$ miles from Bill's house

   (b) $s'(t) = 40$ miles per hour (eastward)

   (c) Infinitely many, since any line of the form $40t + C$ has a slope of 40. Examples include $40t - 10$, $40t$, and $40t + 3$. The differences between these lines are their y-intercepts.

   (d) Since the distance traveled at the start of the trip is zero, the constant $C = 0$. Therefore, $s(t) = 40t$ miles traveled.