6. [11 points]
   a. [2 points] If the range of the function \( y = H(x) \) is \((-4, 3]\), what should be the range of the function \( G(x) = H(x + 10) - 20 \)? Write your answer using interval notation or inequalities.

   \[ \text{Solution:} \quad (-24, -17) \]

   b. [3 points] Find the domain of the function

   \[ k(x) = \frac{100}{\sqrt{1 - 2x}} \]

   Write your answer using interval notation or inequalities. Show all your work.

   \[ \text{Solution:} \quad \text{We need} \quad 1 - 2x \geq 0 \quad \text{and} \quad \sqrt{1 - 2x} \neq 0. \quad \text{This implies that} \quad 1 - 2x > 0. \quad \text{Hence} \quad x < \frac{1}{2} \]

   c. [4 points] Find the equation of the linear function \( f(x) \) that has an \( x \)-intercept at 3, and is perpendicular to the line \( 4x - 3y = 1 \). Show all your work.

   \[ \text{Solution:} \quad \text{We know that} \quad m = -\frac{3}{4} \quad \text{and} \quad (3, 0) \quad \text{is on the graph of the line.} \quad \text{Hence if} \]
   \[ f(x) = -\frac{3}{4}x + b, \text{ then } 0 = -\frac{3}{4}(3) + b. \quad \text{This yields} \quad b = \frac{9}{4}. \quad \text{Therefore} \quad f(x) = -\frac{3}{4}x + \frac{9}{4}. \]

   d. [2 points] The graph of the function \( f(x) \) is given below. In which interval is the value of the average rate of change of \( f(x) \) the largest? Circle your answer.

   \[ \text{Solution:} \]
   
   i) On \( 0 \leq x \leq 4 \)

   ii) On \( 1 \leq x \leq 3 \)

   iii) \[ \text{On } 3 \leq x \leq 5 \]

   iv) On \( 2 \leq x \leq 5 \)