**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.

*Solution:* $(-24, -17]$

**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.

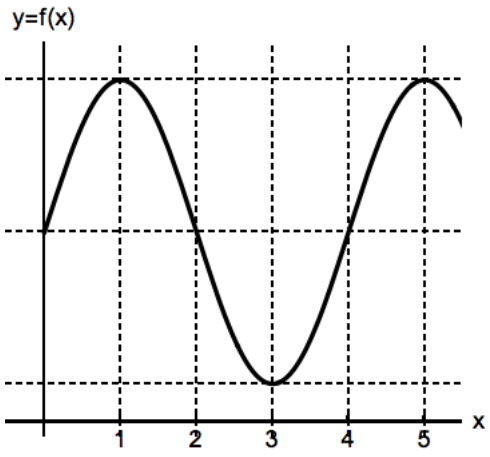
*Solution:* We need $1 - 2x \geq 0$ and $\sqrt{1 - 2x} \neq 0$. This implies that $1 - 2x > 0$. Hence $x < \frac{1}{2}$

**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.

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

**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.

*Solution:*




i) On $0 \leq x \leq 4$

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

iii) On $3 \leq x \leq 5$

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