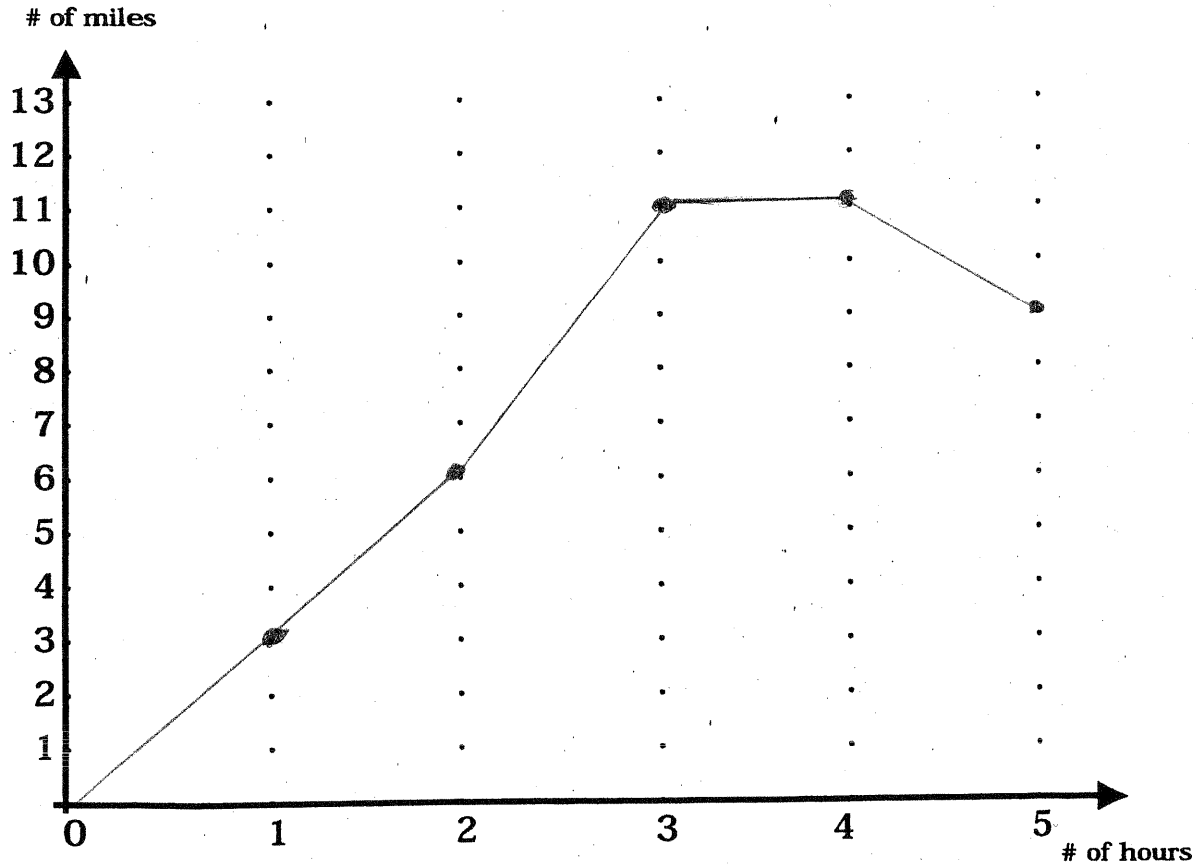
2. ***Margie walked away from her house for 2 hours at 3 miles/hour; next, she jogged for 1 hour at 5 miles per hour. After that, she stopped for one hour to rest. After her rest, she resumed her walk towards her house at a speed of 2 miles/hour.***

a) Graph her distance, D(t), from her house from the moment she left her house, for $0 \le t \le 5$.



b) Determine the piecewise defined function D(t).

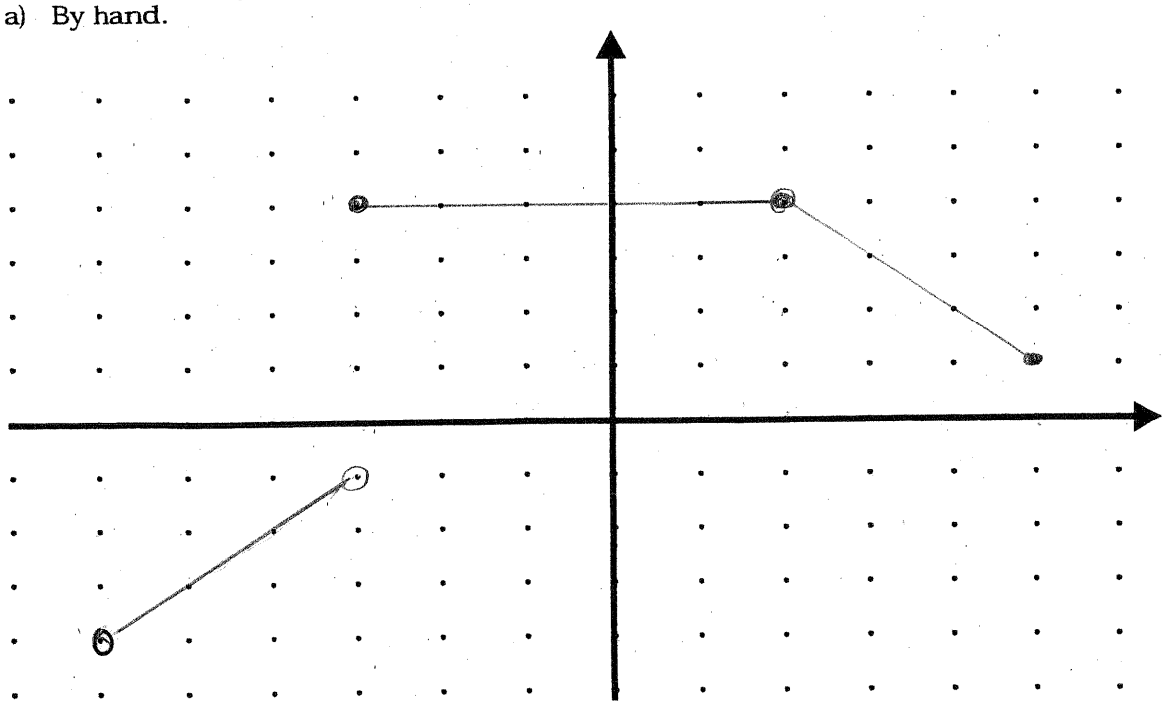
$$D(t) = \begin{cases} 3x & 0 \le x \le 2 \\ 6 + 5(x-2) = 5x - 4 & 2 < x \le 3 \\ 11 & 3 < x \le 4 \\ 11 + -2(x-4) = -2x + 19 & 4 < x \le 5 \end{cases}$$

c) Use the above equations to determine <u>algebraically</u> how far was Marge from her home (show your work)...

- 1.5 hours after she left home — $3 \cdot \frac{3}{2} = 4.5$
- 2.5 hours after she left home — $6 + 2.5 = 8.5$
- 3.5 hours after she left home — 11
- 4.5 hours after she left home — $11 + -2\left(\frac{1}{2}\right) = 10$

3. Graph: $f(x) = \begin{cases} x+2 & -6 < x < -3 \\ 4 & -3 \le x < 2 \\ -x+6 & 2 \le x \le 5 \end{cases}$ in the coordinate plane below.

a) By hand.



b) Evaluate algebraically. Show your work. Verify our answers from the graph.

f(-8) = undefined

f(-6) = undefined

f(-3) = 4

f(0) = 4

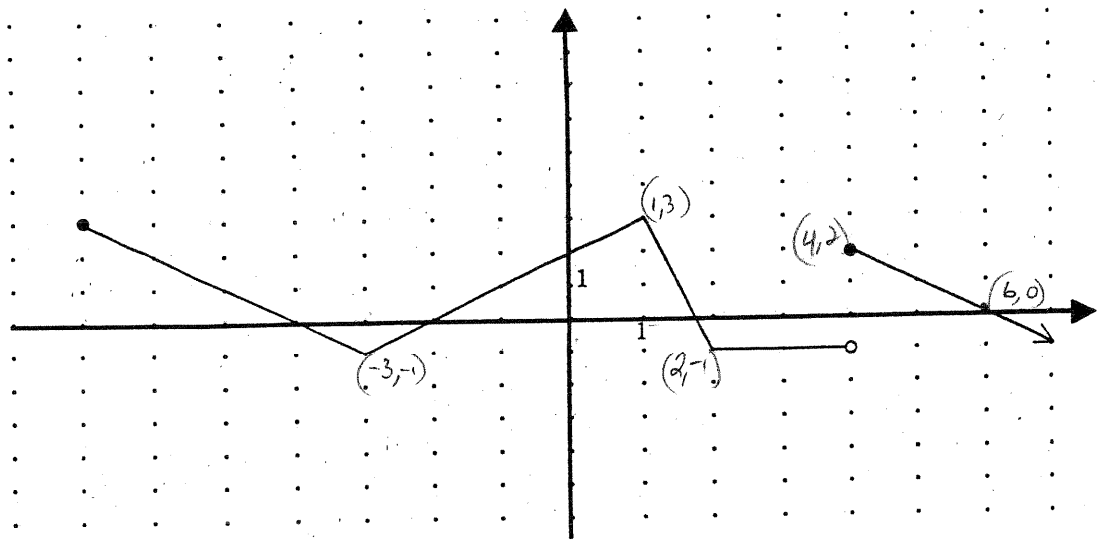
f(2) = 4

f(4) = 2

f(5) = 1

f(10) = undefined

4. Determine the equations and their respective domains of the piecewise defined function depicted below.



$(-7,3)$ $(-3,-1)$

$m = \frac{3+1}{-7+3} = \frac{4}{-4} = -1$

$-1 = -1(-3) + b$

$-4 = b$

$(-3,-1)$ $(1,3)$

$m = \frac{3+1}{1+3} = \frac{4}{4} = 1$

$(1,3)$ $(2,-1)$

$m = \frac{3+1}{1+2} = \frac{4}{-1} = -4$

$3 = -4 \cdot 1 + b$

$7 = b$

$(4,2)$ $(6,0)$

$m = \frac{2-0}{4-6} = \frac{2}{-2} = -1$

$0 = -1 \cdot 6 + b$

$6 = b$

$$f(x) = \begin{cases} -x-4 & -7 \le x < -3 \\ x+2 & -3 \le x < 1 \\ -4x+7 & 1 \le x < 2 \\ -1 & 2 \le x < 4 \\ -x+6 & x \ge 4 \end{cases}$$