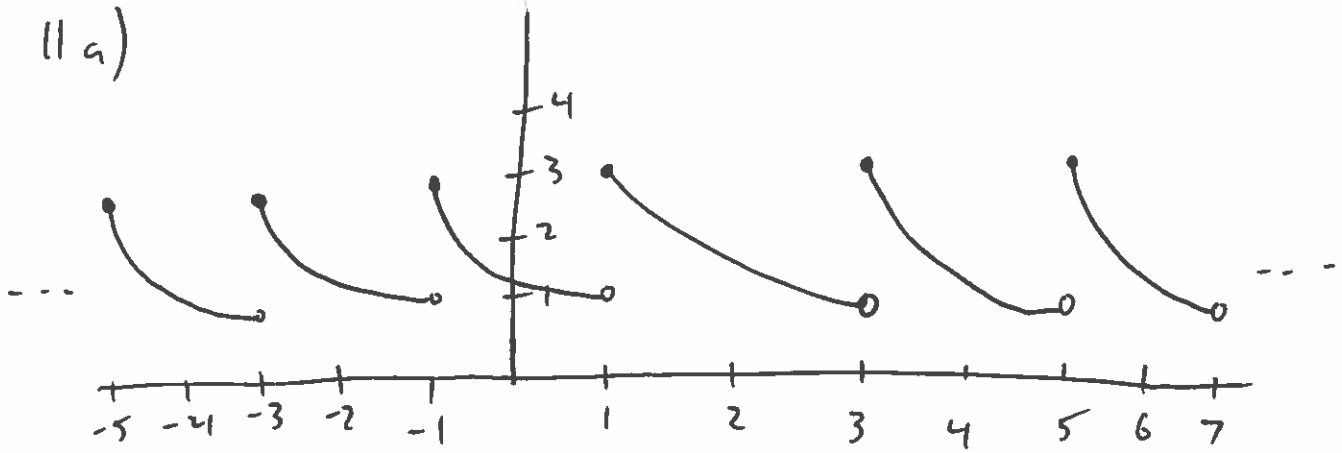
Homework 3; 1.6A (1-6, 8-11, 14, 15), 2.1A (3, 4, 9)

1.6

1) False
2) True
3) False
4) False
5) True
6) True
8) False
9) $f(20) = f(11) = f(2) = 3$ because f has period 9
10) $f(28) = f(17) = f(6) = -7$ because f has period 11

11 a)



b) 2 is between 1 and 3, so $g(2) = \frac{3}{2}$
c) Since g has period 2, $g(4) = g(2) = \frac{3}{2}$
d) Since g has period 2, $g(-2.5) = g(-.5) = g(1.5) = \frac{3}{1.5} = 2$
e) Since 3 is <u>not</u> in $[1,3)$, $g(3) = g(1) = \frac{3}{1} = 3$
↳ also, see graph

14) The graph has maximum y-value $M = -2$, and minimum y-value $m = -6$

So the amplitude of $f(x)$ is $\frac{-2-(-6)}{2} = 2$

and the midline occurs at $y = \frac{-2+(-6)}{2} = -4$

If you shift the graph of f to the left 4 units, you get the same graph. If you shift the graph to the left any less than 4 units, you don't get the same graph.

Therefore, the period of $f(x)$ is 4

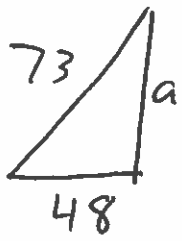
15a) The maximum y-value attained by $f(x)$ is $2.5 = M$ and the minimum y-value attained is -1.5. So the midline occurs at $y = \frac{2.5+(-1.5)}{2} = \frac{1}{2}$

b) The amplitude of $f(x)$ is $\frac{2.5-(-1.5)}{2} = 2$

c) If you shift the graph of $f(x)$ to the left 3 units, you get the same graph. If you shift the graph any less than 3 units, you don't get the same graph. Therefore $f(x)$ has period 3.

2.1

3)



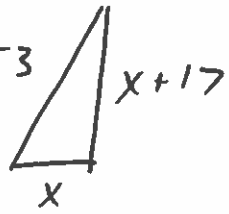
$a^2 + 48^2 = 73^2 \rightarrow a^2 + 2304 = 5329$

$\rightarrow a^2 = 3025$

$\rightarrow a = 55$

Therefore, area $= \frac{1}{2} \cdot 55 \cdot 48 = 1320\ ft^2$

4)



$x^2 + (x+17)^2 = 53^2$

$\rightarrow x^2 + x^2 + 34x + 289 = 2809$

$\rightarrow 2x^2 + 34x - 2520 = 0$

$\rightarrow x^2 + 17x - 1260 = 0$

$\rightarrow (x-28)(x+45) = 0$

$\rightarrow x = 28$ or $x = -45$

x must be 28 since x is positive, so

$x + 17 = 45$, so the perimeter is

$28 + 45 + 53 = 126$

9) The longest straight line you can draw is the diagonal 

and so we have $l^2 = 8.5^2 + 11^2 = 193.25$

so $l = \sqrt{193.25} \approx 13.9$ in