Functions and Graphs solution

(a) i. $f(-2) = 1 - 3(-2) = 1 + 6 = 7$ $g(5) = 1 - (5)^2 = 1 - 25 = -24$

ii. $f(x + 1) = 1 - 3(x + 1) =$

$1 - 3x - 3 =$

$-3x - 2$

iii. $f(x + 1) = f(-2) + g(5)$ **NB**: CARRY ANSWERS FORWARD, look for link in the questions

$-3x - 2 = 7 + (-24)$ Solve means find x, remember.

$-3x = 7 - 24 + 2$

$-3x = -15$

$3x = 15$

$x = 5$

(b)

i. The other side $10 - x - x =$ $10 - 2x$

ii. Area = L x W $(5 - x)(10 - 2x)$ split the brackets

$5(10 - 2x) - x(10 - 2x) = 50 - 10x - 10x + 2x^2 =$

Area = $50 - 20x + 2x^2$

iii. $f(x) = 50 - 20x + 2x^2$

$f(0) = 50 - 20(0) + 2(0)^2 = 50$ (0, 50)

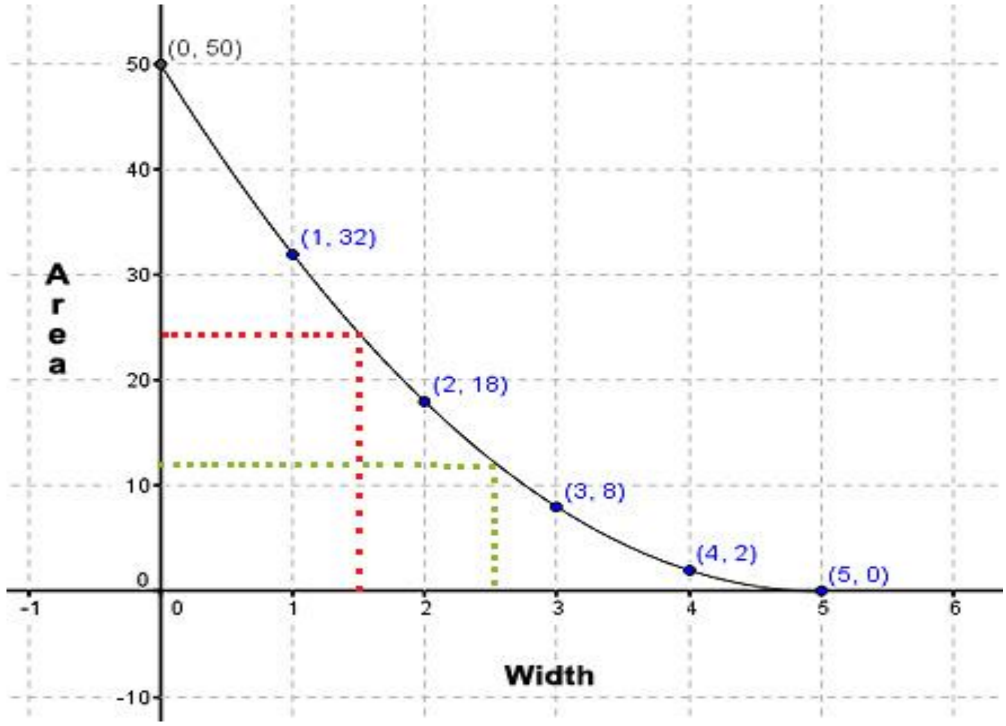
$f(1) = 50 - 20(1) + 2(1)^2 = 32$ (1, 32)

$f(2) = 50 - 20(2) + 2(2)^2 = 18$ (2, 18)

$f(3) = 50 - 20(3) + 2(3)^2 = 8$ (3, 8)

$f(4) = 50 - 20(4) + 2(4)^2 = 2$ (4, 2)

$f(5) = 50 - 20(5) + 2(5)^2 = 0$ (5, 0)



iv. Area = 25 m^2 vi. X = 2.5m

(c) Rule: sub in points you see on graph into the function

(i) $F(x) = x^2 + qx + p$

(-1,0) $0 = (-1)^2 + q(-1) + p$

$0 = 1 - q + p$ <u>q – p = 1</u>

(2,0) $0 = (2)^2 + q(2) + p$

$0 = 4 + 2q + p$ <u>2q + p = -4</u>

<u>Simultaneous equations:</u>

q – p = 1

<u>2q + p = -4</u>

3q = -3

q = -1

q = -1

q – p = 1

-1 – p = 1

-1 – 1 = p

p = -2

(ii) (t, 5t-2) is ON the graph so we SUB it into the function

$F(x) = x^2 + qx + p$

$F(x) = x^2 - 1x - 2$ sub in t for x and 5t – 2 for y

$5t - 2 = t^2 - t - 2$

$t^2 - t - 2 - 5t + 2 = 0$

$t^2 - 6t = 0$ factorise and solve using HCF rule or – b formula, remember c would = 0

$t(t - 6) = 0$

t = 0 or t- 6 = 0 so t = 0 or t = 6