Sample Paper 5: Paper 1

Question 8 (50 marks)

Question 8 (a)

$2x + 2y = 160$

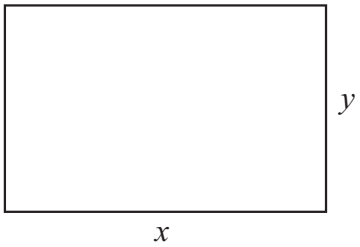
$x + y = 80$

$\therefore\ y = 80 - x$

Question 8 (b)

$A = xy = x(80 - x)$

$= 80x - x^2$



Question 8 (c)

$A = 80x - x^2$

$x = 0 : A = 80(0) - (0)^2 = 0$

$x = 10 : A = 80(10) - (10)^2 = 800 - 100 = 700$

$x = 20 : A = 80(20) - (20)^2 = 1600 - 400 = 1200$

$x = 30 : A = 80(30) - (30)^2 = 2400 - 900 = 1500$

$x = 40 : A = 80(40) - (40)^2 = 3200 - 1600 = 1600$

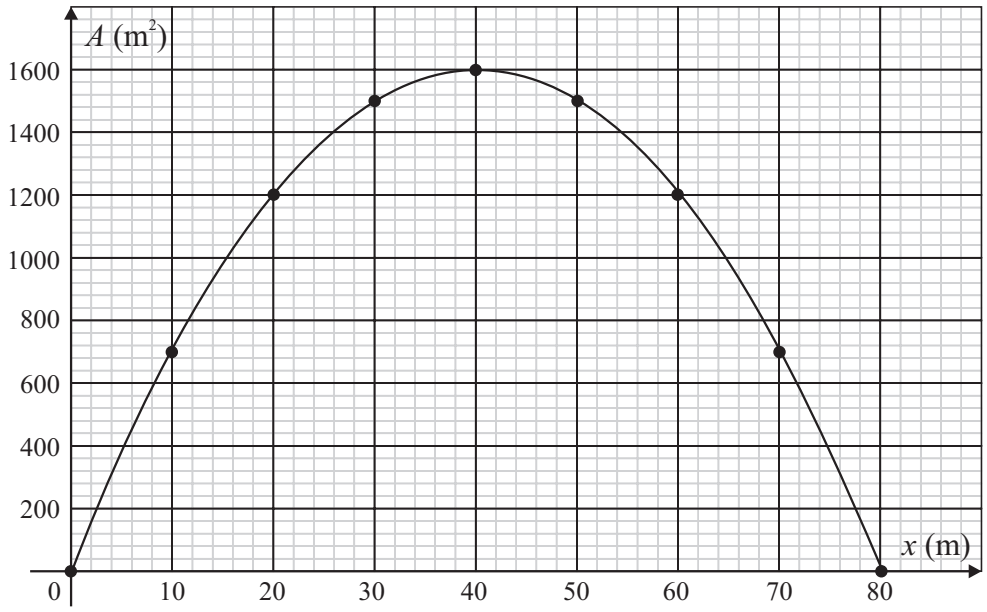
$x = 50 : A = 80(50) - (50)^2 = 4000 - 2500 = 1500$

$x = 60 : A = 80(60) - (60)^2 = 4800 - 3600 = 1200$

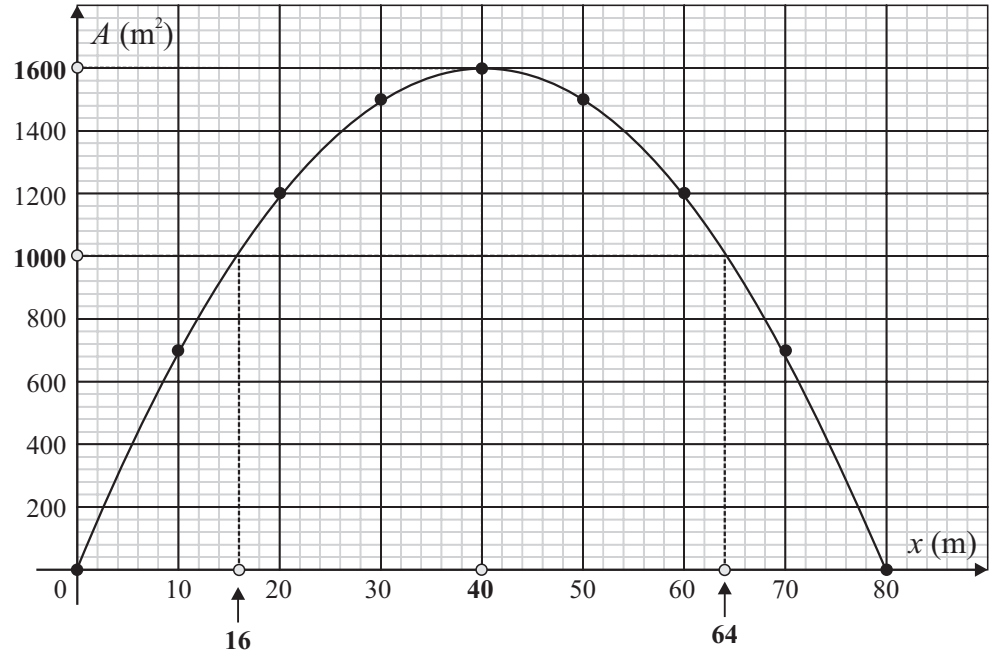
$x = 70 : A = 80(70) - (70)^2 = 5600 - 4900 = 700$

$x = 80 : A = 80(80) - (80)^2 = 6400 - 6400 = 0$

x (m)	0	10	20	30	40	50	60	70	80
A (m^2)	0	700	1200	1500	1600	1500	1200	700	0



Question 8 (d) (i)



Maximum area = 1600 m^2
Go to this number on the vertical axis and read off the corresponding x value.
$\therefore x = 40$ m

$y = (80 - x) = (80 - 40) = 40$ m

Dimensions: 40 m by 40 m

Question 8 (d) (ii)

Go to 1000 m^2 on the vertical axis and read off the corresponding x values.
$\therefore x = 16$ m, 64 m

$x = 16$ m: $y = (80 - x) = (80 - 16) = 64$ m

$x = 64$ m: $y = (80 - x) = (80 - 64) = 16$ m

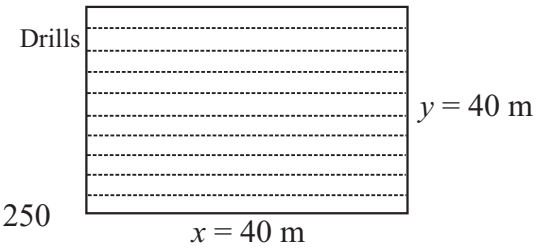
Dimensions: 16 m by 64 m

Question 8 (e)

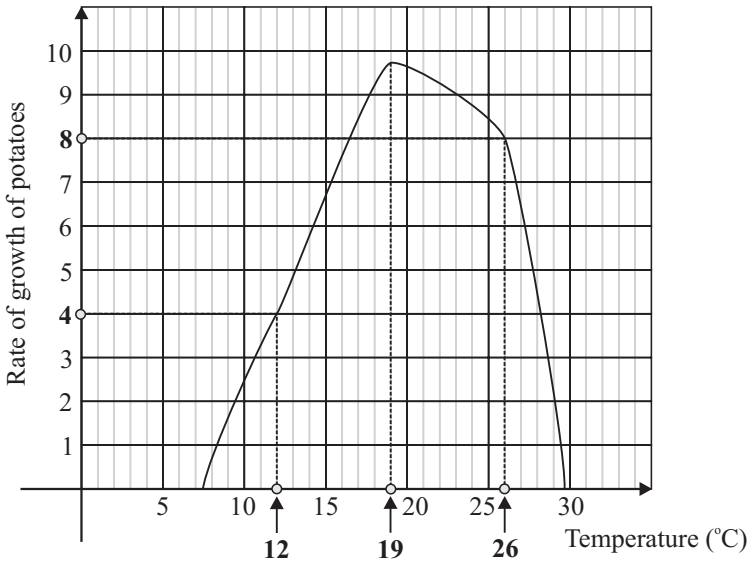
Maximum number of drills $= \dfrac{40 \text{ m}}{0.32 \text{ m}} = 125$

Number of potato plants per drill $= \dfrac{40 \text{ m}}{0.16 \text{ m}} = 250$

Maximum number of potato plants = 250 × 125 = 31 250



Question 8 (f) (i)



At 12°C the growth rate is 4.
At 26°C the growth rate is 8.
There is twice the growth rate between the maximum and minimum temperatures.

Question 8 (f) (ii)

19°C gives the maximum growth rate.