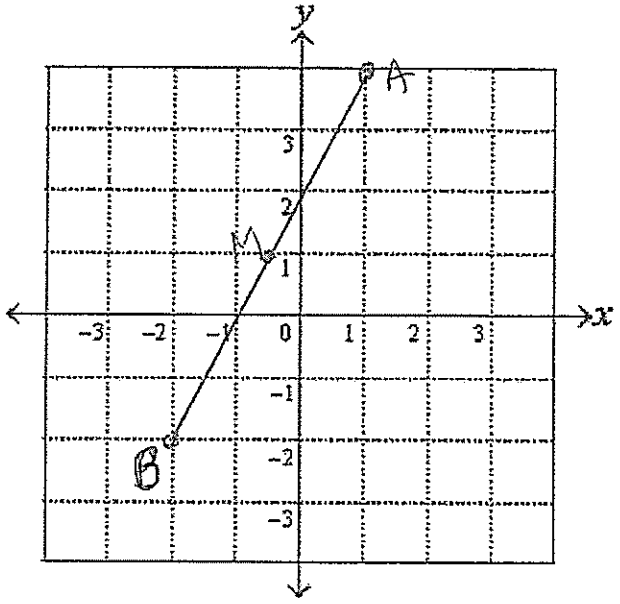
	Linear relationships	Marks
1.	a) Plot the points A (1, 4) and B (-2, -2) on the number plane.	(1)



b) Join the points AB and find the midpoint of AB. (2)

$\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$ $\left(\frac{1-2}{2}, \frac{4-2}{2}\right)$

$= \left(-\frac{1}{2}, 1\right)$

c) Calculate the length AB, correct to one decimal place. (2)

$d = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$ $d = \sqrt{45}$ units

$d = \sqrt{(1--2)^2+(-2-4)^2}$ $d \doteq 6.7$ units

$d = \sqrt{3^2+(-6)^2}$

$d = \sqrt{9+36}$

d) Calculate the gradient of interval AB. (2)

$m = \frac{y_2-y_1}{x_2-x_1}$

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

$= \frac{-6}{-3}$

$= 2$

2 (3)

Complete the sentences using one of the following words {positive, gradient, perpendicular, negative, parallel}

a) The equation of the line y = 3x + 2 is in gradient intercept form. 1

b) The line y = 3x + 2 is parallel to y = 3x – 6. 1

c) The line y = -4x – 2 has a negative gradient. 1

3 (2)

Write the line 4x – 2y + 2 = 0 in gradient intercept form.

$4x - 2y + 2 = 0$

$\frac{4x}{2} + \frac{2}{2} = \frac{2y}{2}$ 1

$y = 2x + 1$ 1

4 (3)

For the line y = -2x + 4 write;

a) the gradient -2 1

b) y-intercept 4 1

c) the equation of the line perpendicular to y = -2x + 4 passing through -6 on the y-axis.

$m_1 m_2 = -1$ $y = mx + b$

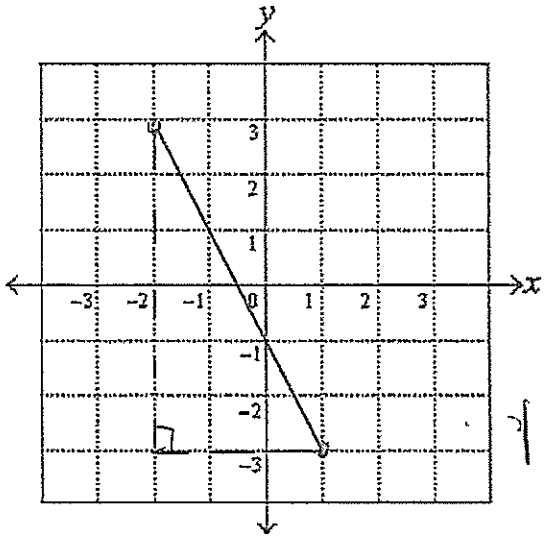
$-2 \times m_2 = -1$ $y = \frac{1}{2}x - 6$ 1

$m_2 = \frac{1}{2}$

5 (3)

Find the equation of the line drawn through the points (-2, 3) and (1, -3).

Leave in gradient-intercept form.

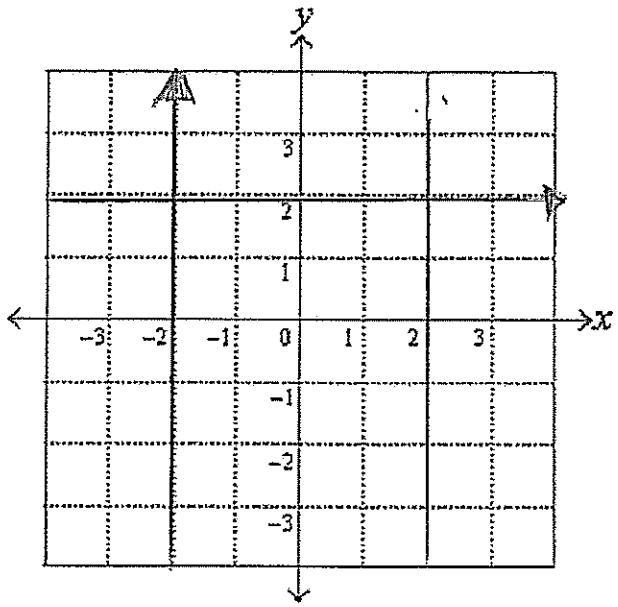
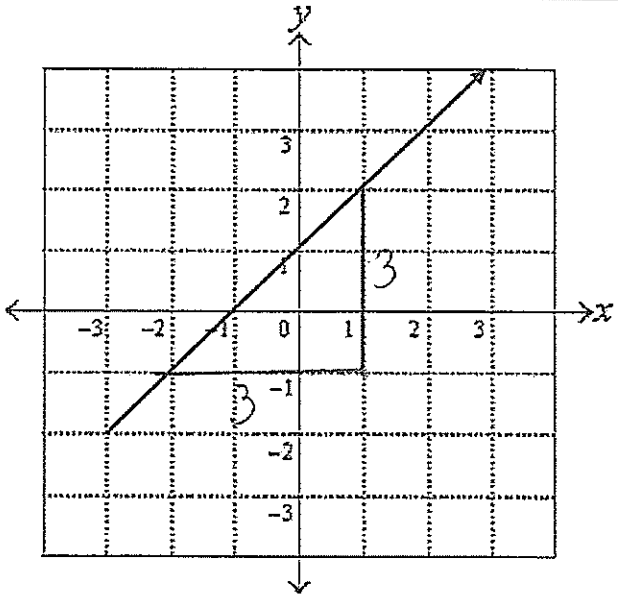


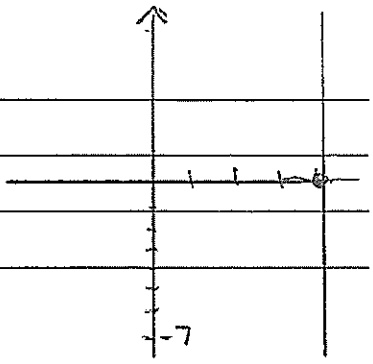
$m = \frac{\text{rise}}{\text{run}}$ $m = \frac{6}{3}$

$m = 2$ 1

$y = mx + b$

$y = 2x - 1$ 1

6	a) Draw y = 2 and x = -2 on the number plane  b) Write the point of Intersection of the two lines (-2, 2)	(2)
7	 a) Write the equation of the line above in Gradient Intercept form. $m = \frac{3}{3}$ $m = 1$ $y = x + 1$ b) Write the equation in general form. $y = x + 1$ $x - y + 1 = 0$	(2)

8	Find the equation of the line that is parallel to the y-axis and passes through the point (4,-7), $x = 4$ 	(1)
*9	Find the equation of the line perpendicular to $6x - 3y - 10 = 0$ which passes through the Midpoint of $(4, 7)$ and $(8, 13)$. $6x - 3y - 10 = 0$ $6x - 10 = 3y$ $y = \frac{6}{3}x - \frac{10}{3}$ $y = 2x - \frac{10}{3}$ $m_1 = 2.$ (1) $M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ $= \left(\frac{4+8}{2}, \frac{7+13}{2}\right)$ $= (12/2, 20/2)$ $= (6, 10)$ (1) $y = mx + b$	(3)

$m_1 m_2 = -1$

$2 \times m_2 = -1$

$m_2 = -\frac{1}{2}$

$y = -\frac{1}{2}x + b \quad (6, 10)$

$10 = -\frac{1}{2} \times 6 + b$

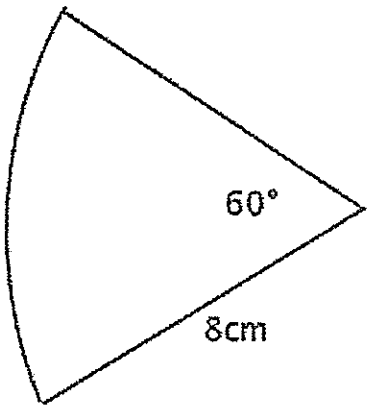
$10 = -3 + b$

$13 = b$

$y = -\frac{1}{2}x + 13$ (1)

Area and Surface Area

1 Find the area of the sector below. **(2)**

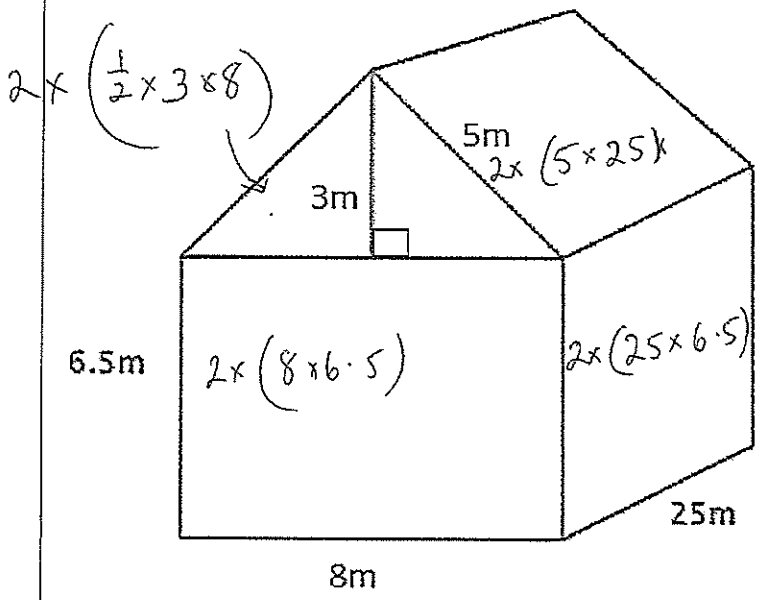


$A = \frac{1}{6} \times \pi r^2$

$A = \frac{1}{6} \times \pi \times 8^2$ 1

$A = 33.5\ cm^2$ 1

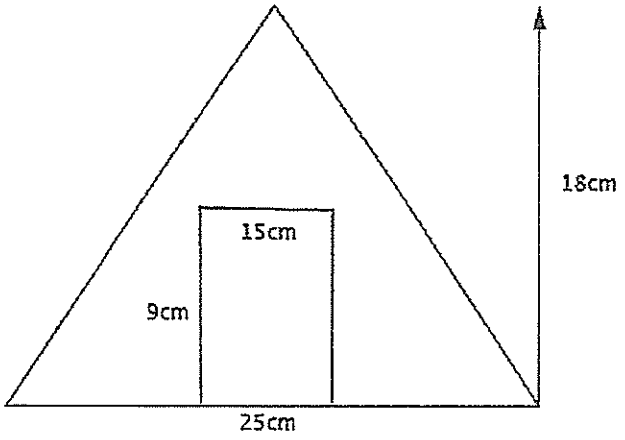
2 Find the surface area of the greenhouse below. The floor is not included. **(3)**



$SA = (2 \times 8 \times 6.5) + (2 \times 25 \times 6.5) + (2 \times 5 \times 25)$ 1
$+ (3 \times 8)$

$= 104 + 325 + 250 + 24$ 1

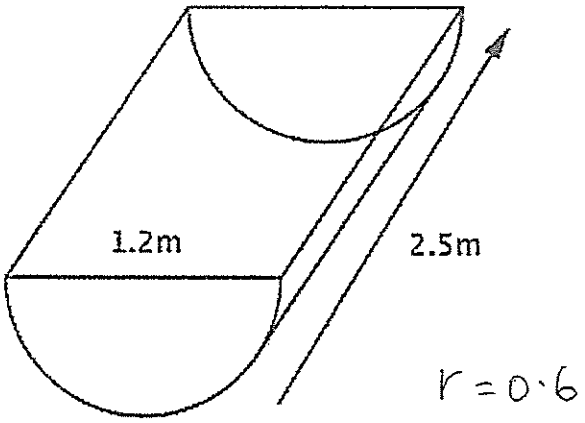
$= 703\ m^2$ 1

3	Find the area of the front of the tent shown below, excluding the door.  	(3)

Area = $\left(\frac{1}{2} \times 18 \times 25\right) - (9 \times 15)$ 1

$= 225 - 135$ 1

$= 90\,cm^2$ 1

*4	A farmer is planning to make a covered food trough for his cattle. The dimensions are shown below.  $r = 0.6$ a) How much metal will he needed to construct the trough to the nearest square metre.	(3)

$SA = \pi r^2 + \pi r h + L \times b$ 1

$= \pi \times 0.6^2 + \pi \times 0.6 \times 2.5 + (1.2 \times 2.5)$ 1

$= 1.13 + 4.71 + 3$ 1

$= 8.84$ 1

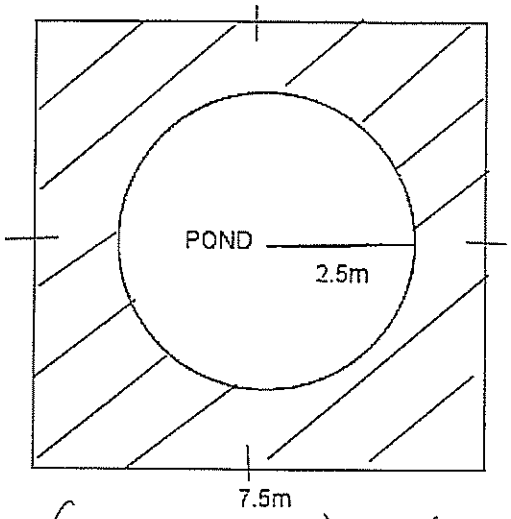
$= 9m^2$

b) Sheet metal is \$15 per square metre. What is the total cost of the metal? (1)

$= 8.84 \times 15$ $= 9 \times 15$

$= \$132.60$ $= \$135$ 1

5 Find the area of the grass around the outside of the pond below. (2)

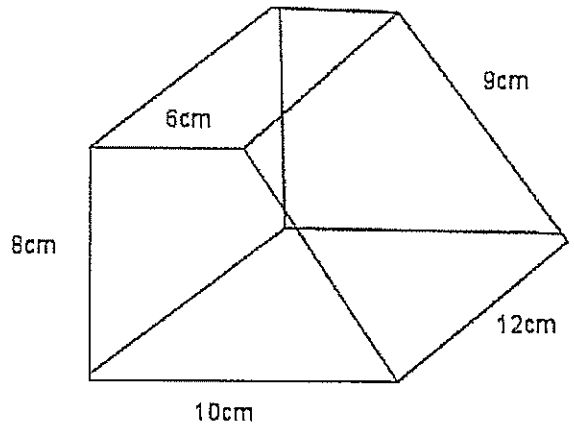


$A = (7.5 \times 7.5) - (\pi \times 2.5^2)$ 1

$A = 56.25 - 19.63$

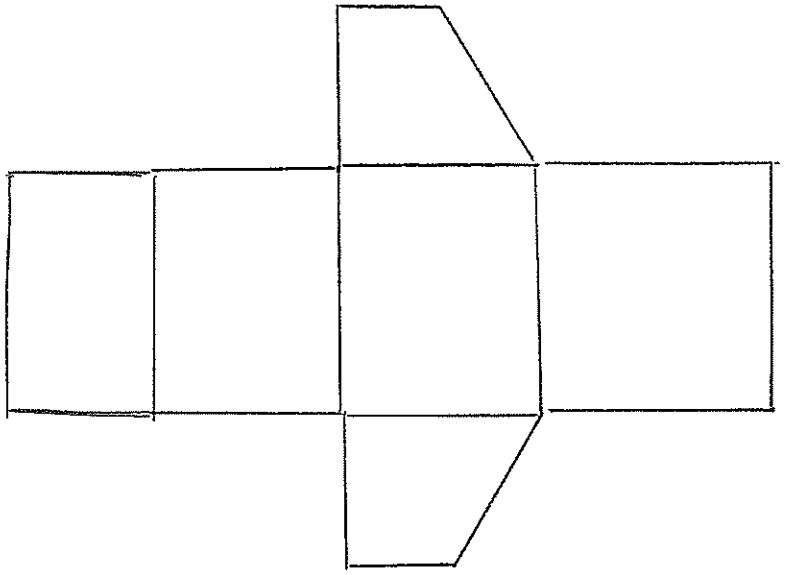
$A = 36.6\ m^2$ 1

6



$A = \left[\frac{1}{2} \times 8 \times (6+10)\right] \times 2 +$
$9 \times 12 + 8 \times 12 + 10 \times 12$
$+ 6 \times 12$

a) Draw the net of the trapezoidal prism above in the space below. **(1)**



(3)

b) Find the Surface area of the Trapezoidal prism.

$SA = 8 \times (6+10) + (9 \times 12) + (8 \times 12) + (10 \times 12) + (6 \times 12)$ 1

$= 128 + 108 + 96 + 120 + 72$ 1

$= 524\ cm^2$ 1

7 Fill in the gaps {area, circles, volume, sector} **(2)**

a) Surface Area is the total area of all faces of a solid. 1

b) A sector is part of a circle? 1

End of Examination