



Carlingford High School

2020 YEAR 10 TERM 1 EXAM

Mathematics 5.2

STUDENT NAME: SOLUTIONS

Teacher: (Please Circle)

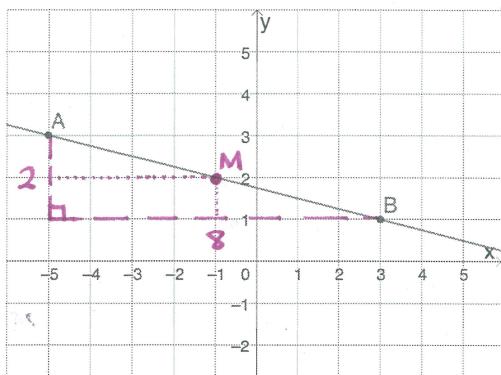
10MA2X (Ms Virmani/Ms Wilson) 10MA2Y (Mr Gong) 10MA2Z (Ms Blakeley)

- Instructions**
- Working time - 50 minutes
 - Write using black pen
 - Calculators approved by NESA may be used
 - Show relevant mathematical reasoning and/or calculations

TOPIC	MARKS
Linear Relationships Questions: 1 – 10	/20
Surface Area and Volume Questions: 11 – 16	/20
TOTAL	/40

LINEAR RELATIONSHIPS

Questions 1 – 3 refer to the graph below.



1. Find the length of the interval AB, answer correct to 2 decimal places.

$$\begin{aligned} AB &= \sqrt{2^2 + 8^2} \\ &= \sqrt{68} \\ &= 8.246\dots \\ &= 8.25 \end{aligned}$$

$$\begin{aligned} AB &= \sqrt{(-5-3)^2 + (3-1)^2} \\ &= \sqrt{68} \\ &= 8.246\dots \\ &= 8.25 \end{aligned}$$

[2]

2. Find the midpoint of the interval AB

$$M = (-1, 2)$$

$$\begin{aligned} M &= \left(\frac{-5+3}{2}, \frac{3+1}{2} \right) \\ &= (-1, 2) \end{aligned}$$

[2]

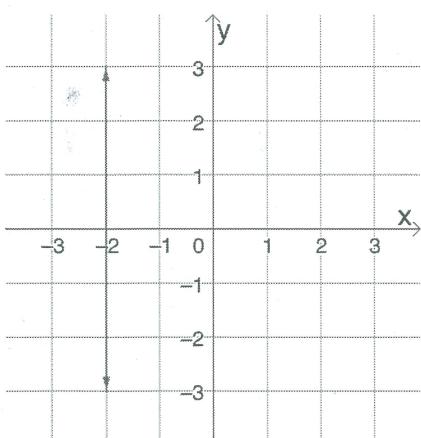
3. Find the gradient of the interval AB

$$\begin{aligned} m &= -\frac{2}{8} \\ &= -\frac{1}{4} \end{aligned}$$

$$\begin{aligned} m &= \frac{3-1}{-5-3} \\ &= -\frac{1}{4} \end{aligned}$$

[2]

4. What is the equation of this line?



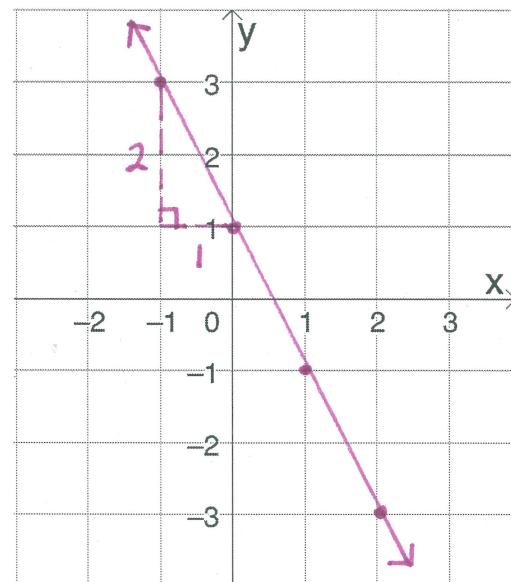
$$x = -2$$

5. Write the equation of a line with gradient 5 and y-intercept -7. [1]

$$y = 5x - 7$$

6. (a) Graph this table of values on the number plane below. [1]

x	-1	0	1	2
y	3	1	-1	-3



- (b) Find the equation of the line you graphed in part (a). [2]

$$\begin{aligned} m &= -2 \\ &= -2 \end{aligned}$$

$$y\text{-int} = 1$$

$$\therefore \text{eqn is } y = -2x + 1$$

7. Which line is parallel to $y = 2 + 3x$? [1]

A $y = 1 - 3x$

$$m = 3$$

B $y = \frac{x}{3} + 2$

C $y = 3$

D $y = 3x + 6$

8. Test whether the point $(-3, 1)$ lies on the line $y = 2x - 5$.

$$\text{LHS: } y = 1$$

$$\text{RHS: } 2x - 5 = 2 \times (-3) - 5 \\ = -11$$

$$\text{LHS} \neq \text{RHS}$$

$\therefore (-3, 1)$ does not lie on the line

9. Graph $2x - 3y = 3$ by finding the gradient and y -intercept first.

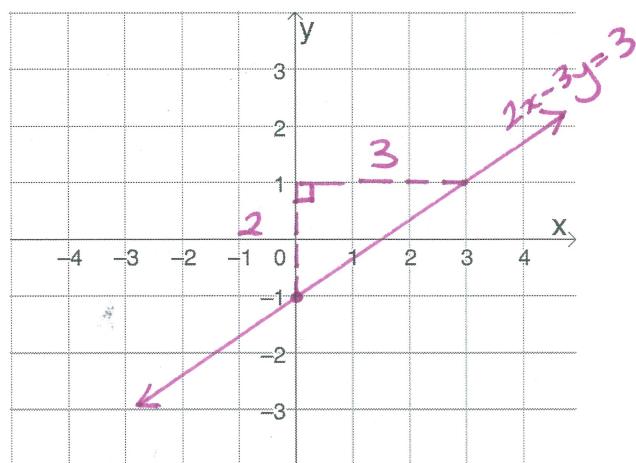
$$2x - 3y = 3$$

$$3y = 2x - 3$$

$$y = \frac{2}{3}x - 1$$

$$\text{Gradient} = \frac{2}{3}$$

$$y\text{-intercept} = -1$$



10. Find the equation of the line that is perpendicular to $y = 3x - 1$ and passes through the x -axis at 4.

$$y = 3x - 1 \Rightarrow m = 3$$

$$\therefore \text{perpendicular } m = -\frac{1}{3}$$

$$\text{sub. } m = -\frac{1}{3} \text{ and } (4, 0) \text{ into } y = mx + b$$

$$0 = -\frac{1}{3}(4) + b$$

$$b = \frac{4}{3}$$

$$\therefore \text{eqn is } y = -\frac{1}{3}x + \frac{4}{3}$$

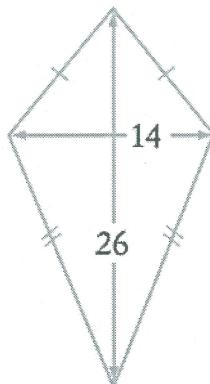
$$\text{or } x + 3y - 4 = 0$$

[2]

SURFACE AREA AND VOLUME

11. Find the area of the following shapes.

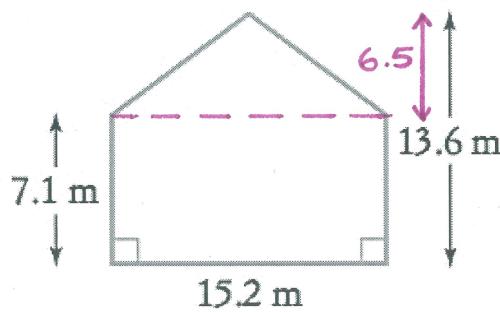
(a)



$$A = \frac{1}{2} \times 14 \times 26 \\ = 182 \text{ units}^2$$

[1]

[1] (b)

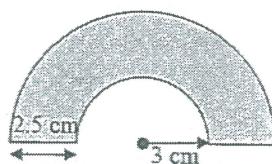


[2]

[1]

$$A = 15.2 \times 7.1 + \frac{1}{2} \times 15.2 \times 6.5 \\ = 157.32 \text{ m}^2$$

[3] (c) Answer correct to 1 decimal place.



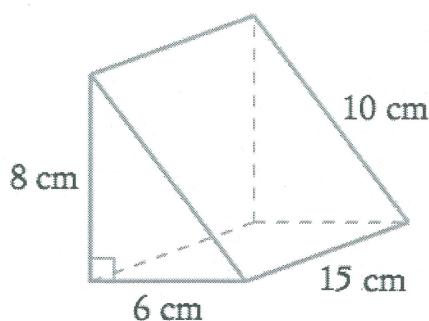
[2]

$$A = \frac{1}{2} \times \pi \times 5.5^2 - \frac{1}{2} \times \pi \times 3^2$$

$$= 33.37\dots$$

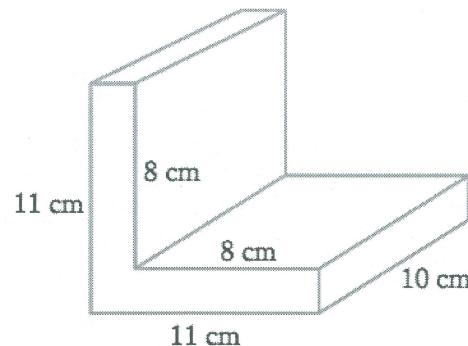
$$= 33.4 \text{ cm}^2$$

12. Calculate the surface area of the following triangular prism.

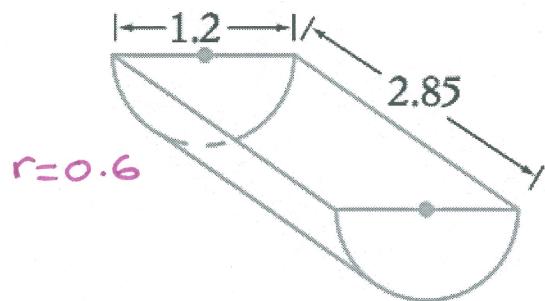


$$\begin{aligned} SA &= 2\left(\frac{1}{2} \times 6 \times 8\right) + 6 \times 15 + 10 \times 15 + 8 \times 15 \\ &= 408 \text{ cm}^2 \end{aligned}$$

[2] 14. For the following solid, calculate:



13. Calculate, correct to 2 decimal places, the surface area of the following closed half cylinder. All measurements are in metres.



$$\begin{aligned} SA &= 2\left(\frac{1}{2} \times \pi \times 0.6^2\right) + \frac{1}{2}(2 \times \pi \times 0.6 \times 2.85) \\ &\quad + 1.2 \times 2.85 \\ &= 9.923 \dots \\ &= 9.92 \text{ m}^2 \end{aligned}$$

[3]

(a) its surface area

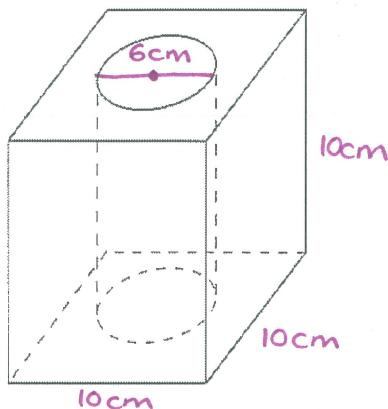
$$\begin{aligned} [2] \quad SA &= 2(11^2 - 8^2) + 10(2 \times 11 + 2 \times 3 + 2 \times 8) \\ &= 554 \text{ cm}^2 \end{aligned}$$

(b) its volume

[2]

$$\begin{aligned} V &= Ah \\ &= (11^2 - 8^2) \times 10 \\ &= 570 \text{ cm}^3 \end{aligned}$$

15. A solid metal cube has a cylinder drilled completely through it, as shown below.

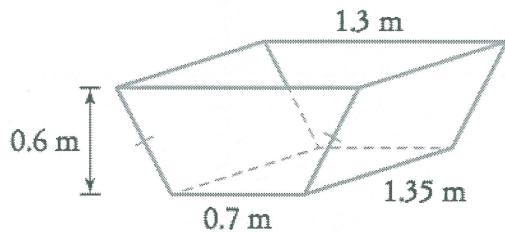


The cube has side lengths of 10 cm and the diameter of the cylindrical hole is 6 cm.
Calculate the volume of the cube with the hole drilled through it, correct to the nearest cm^3 .

$$r = 3 \text{ cm}$$

$$\begin{aligned} V &= Ah \\ &= (10^2 - \pi \times 3^2) \times 10 \\ &= 717.2\dots \\ &= 717 \text{ cm}^3 \end{aligned}$$

- [3] 16. A rubbish disposal skip is in the shape of a trapezoidal prism with dimensions as shown. Find its capacity in litres. [3]



$$\begin{aligned} V &= Ah \\ &= \frac{0.6}{2} (0.7 + 1.3) \times 1.35 \\ &= 0.81 \text{ m}^3 \end{aligned}$$

$$\begin{aligned} \text{Capacity} &= 0.81 \times 1000 \\ &= 810 \text{ L} \end{aligned}$$

END OF EXAM