Register No.	Class

Name : ______________________

BENDEMEER SECONDARY SCHOOL
2022 END-OF-YEAR EXAMINATION
SECONDARY 1 EXPRESS
Mathematics Paper 1

DATE : **10 Oct 2022**
DURATION : **1 hour 15 minutes**
TOTAL : **50 Marks**

READ THESE INSTRUCTIONS FIRST

Write your name, class and register number on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
You may use a 2B pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid/tape.

Answer **all** questions.
Write your answers in the spaces provided on the question paper.
All the diagrams in this paper are **not** drawn to scale.
If working is needed for any question, it must be shown with the answer.
Omission of essential working will result in loss of marks.
The use of an approved scientific calculator is expected, where appropriate.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, use either your calculator value or 3.142, unless the question requires the answer in terms of π.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

FOR EXAMINER'S USE
/ 50

This document consists of **10** printed pages including this cover page.

Answer **all** the questions.

1 From numbers given below, write down

$$\sqrt{4} \quad \pi \quad \frac{22}{7} \quad \sqrt[3]{5} \quad 9 \quad -6$$

(a) a prime number,

Answer : _____ [1]

(b) an irrational number,

Answer : _____ [1]

2 **(a)** Without the use of calculator, evaluate $\left[1\frac{2}{3}+\left(-\frac{1}{6}\right)\right]\div\frac{6}{7}\times\left(1\frac{4}{5}-2\frac{3}{10}\right)$ with necessary workings.

Answer : _____ [2]

2 **(b)** Using a calculator, evaluate the following, leaving your answer in 3 significant figures.

$$\frac{3.25\times\sqrt{1.22}}{11-2.8^3}$$

Answer : _____ [2]

3 **(a)** The number 240, written as a product of its prime factors, is $2^4 \times 3 \times 5$.

(i) Write 360 as a product of its prime numbers.

Answer : _____ [1]

(ii) Find the HCF for both 240 and 360.

Answer : _____ [1]

(iii) Find the smallest non-zero whole number m for which $\frac{360}{m}$ is a factor of 240.

Answer : _____ [1]

3 **(b)** Given that $A = xyz$, $B = xy^3$ and $C = x^3yz^2$, find the lowest common multiple of A, B and C.

Answer : _____ [1]

4 Express each ratio in its simplest form.

(a) $\frac{3}{10} : \frac{5}{6}$

Answer : _____ [1]

(b) 0.5 km : $8\frac{1}{10}$ m : 20 cm

Answer : _____ [2]

5 Expand and simplify the following.

(a) $-4(-2x + y) - 3(x - 6y)$,

Answer : _____ [2]

(b) $\frac{5x}{3} + 7(\frac{1}{4}x - x + 2x)$.

Answer : _____ [2]

6 Express the following as a single fraction in its simplest form.

(a) $\frac{-5x+3y}{3} - \frac{y+3x}{8}$

Answer : _____ [2]

(b) $\frac{3(x+1)}{2} + \frac{4(x-1)}{5}$

Answer : _____ [2]

7 **(a)** Factorise $64x^2y + 16xyz - 24xy$ completely.

Answer : _____ [1]

7 **(bi)** Expand $a(x - y)$.

Answer : _____ [1]

7 **(bii)** Hence use the answer in (b)(i) to evaluate 28 x 165 – 28 x 65.

Answer : _____ [2]

8 **(a)** A new car costs \$120 000. After one year, it is worth \$108 000.
Find the percentage decrease in the value of the car.

Answer : _____% [2]

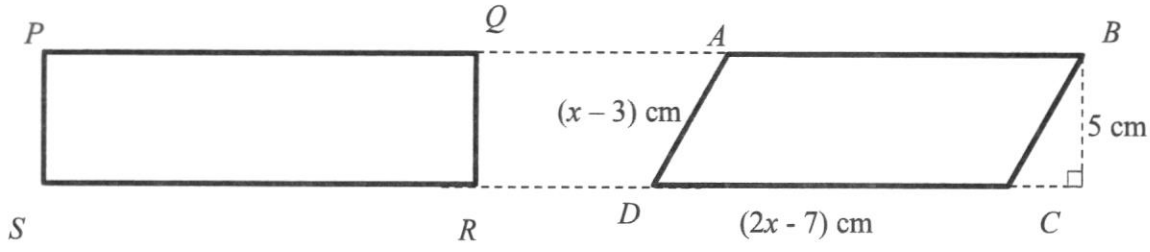
8 **(b)** Chery invested \$6000 in a bank that gave interest of 2% per annum.
Find the simple interest Chery received after a period of 9 months.

Answer : \$_____ [2]

9 Given that the exterior angle of regular polygon is 15°, how many angles does this polygon have?

Answer : _____ [2]

10 The diagram below shows a rectangle $PQRS$ and a parallelogram $ABCD$ where $PQ = AB$ and both shapes share the same height.



(a) Write down, in terms of x, the area of $ABCD$.

Answer : _____ cm^2 [1]

(b) It is given that the area of the rectangle is 55 cm^2, form an equation in x and solve it.

Answer : $x =$ _____ [3]

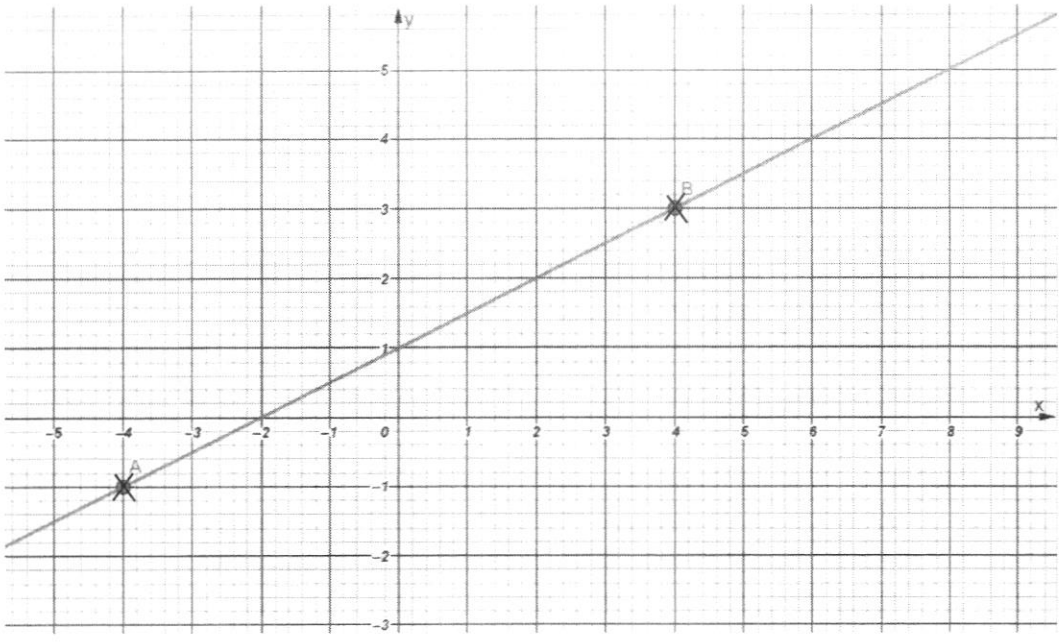
(c) Hence, find the length of AD.

Answer : _____ cm [1]

(d) Find the perimeter of the parallelogram $ABCD$.

Answer : _____ cm [2]

11 The points $A(-4, -1)$ and $B(4, 3)$ are shown in the diagram below.



(a) Find the gradient of AB.

Answer : _____ [2]

(b) What is the value of the y-intercept?

Answer : _____ [1]

(c) Write down the equation of the line AB.

Answer : _____ [1]

12 Solve the following equations.

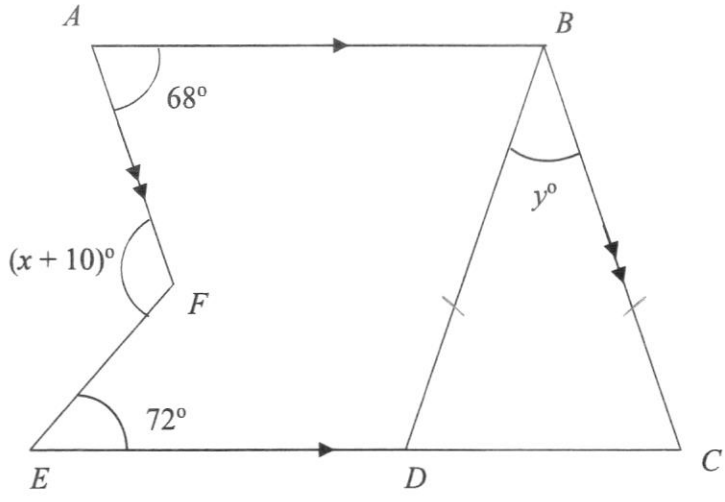
(a) $\frac{2x-5}{3x+2} = \frac{1}{4}$

Answer : $x =$ _____ [2]

(b) $0.3x - 1.7 = 4.3 - 0.9x$

Answer : $x =$ _____ [2]

13 In the figure below, find the values of x and y, stating your reasons clearly.



Answer: $x =$ _____ [2]

$y =$ _____ [2]

End of Paper

Name :	Register No.	Class

BENDEMEER SECONDARY SCHOOL
2022 END-OF-YEAR EXAMINATION
SECONDARY 1 EXPRESS
Mathematics Paper 2

DATE : 11 Oct 2022
DURATION : 1 hour 15 minutes
TOTAL : 50 Marks

READ THESE INSTRUCTIONS FIRST

Write your name, class and register number on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
You may use a 2B pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid/tape.

Answer **all** questions.
Write your answers in the spaces provided on the question paper.
All the diagrams in this paper are **not** drawn to scale.
If working is needed for any question, it must be shown with the answer.
Omission of essential working will result in loss of marks.
The use of an approved scientific calculator is expected, where appropriate.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, use either your calculator value or 3.142, unless the question requires the answer in terms of π.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

FOR EXAMINER'S USE
50

This document consists of **11** printed pages including this cover page.

Answer **all** the questions.

1

SHOPI 9.9 Super Shoppers Sale

TV Shop Voucher

$30 off
Min. Spend $500

TV Shop Voucher

$60 off
Min. Spend $1000

Shopi Member's Discount Voucher:

20% off Final Bill

Shopi Discount Voucher:

25% off for payment using PayPay.

$20 delivery fee applies.

For items more than $1000 – Free delivery

Hire and Purchase plan available

– 10% downpayment and 5% per annum interest rate for 2 years plan.
– Vouchers cannot be used.
– Delivery fee is waived.

Emily signed up with an online shopping app called Shopi and bought a TV during the 9.9 Super Shoppers Sale.

(a) If the TV cost \$800, calculate the total amount of money she need to pay if she paid using PayPay.

Answer: \$_____ [2]

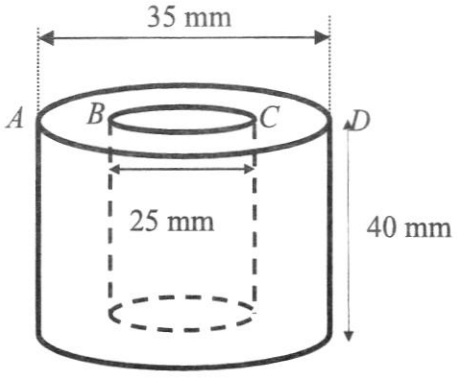
(b) Emily changed her mind and bought a \$2000 smart TV using the Hire and Purchase plan.
Calculate
(i) her downpayment,

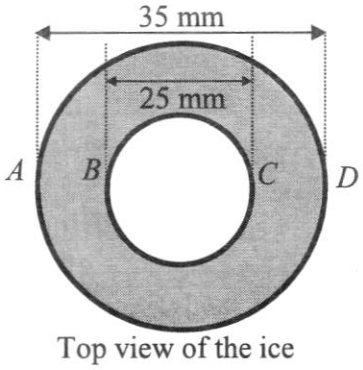
Answer: \$_____ [2]

(ii) the monthly instalments she needed to pay.

Answer: \$_____ [3]

2 Tuck Lee Ice was established in Singapore in 1935 and the name has become synonymous with ice in Singapore. They make food grade ice tube in the form of hollow cylindrical shape, suitable for consumption.
The drawing below shows the 3-dimensional view and cross-section of the ice tube.





Top view of the ice

(a) Find shaded area of the cross-section.

Answer: _____ mm^2 [2]

(b) Find volume of the ice tube.

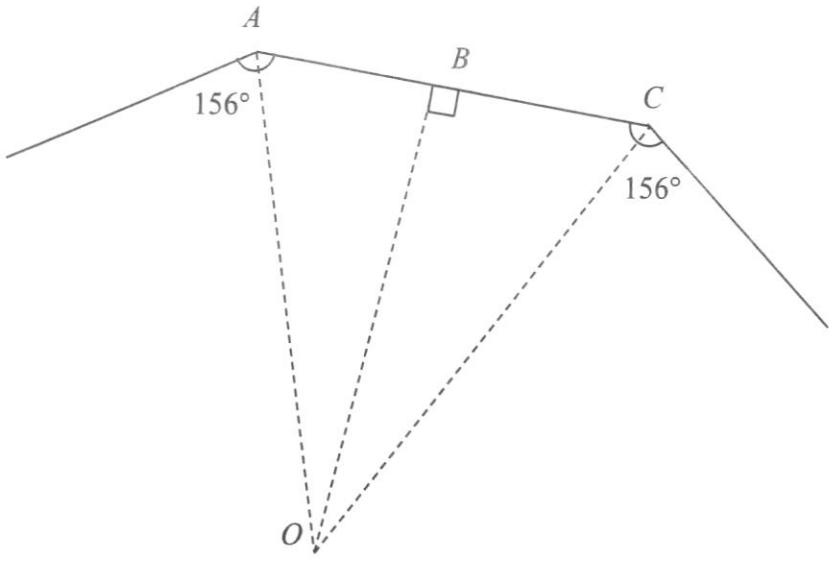
Answer: _____ mm^3 [2]

(c) Given that a packet of ice tubes weights 1kg and the density of ice is 1 g/cm^3, find the number of ice tubes that can be contained in a packet. [density = $\frac{mass}{volume}$]

Answer: _____ [3]

3 The diagram shows part of a regular polygon.

(a) How many sides does this polygon have?



Answer: _____ [2]

(b) Given that O is the centre of the polygon, find the value of $\angle AOC$.

Answer: _____ ° [2]

(c) If $AC = 8$ cm and $OB = 12.5$ cm, find the area of the above polygon.

Answer: _____ cm^2 [2]

4 Towns A and B are 60 km apart. Town M is between Town A and B. Chandra drove from Town A to Town M at an average speed of 16 m/s in 30 minutes and then from Town M to Town B at an average speed of 25 m/s.
Find

(a) the distance between Town A and Town M, leaving your answer in km.

Answer: _____km [2]

(b) the average speed of Chandra's car for the entire journey from Town A to Town B.

Answer: _____ km/h [3]

5 Countries in the world follow different time zones. There are 24 main time zones in the world.
The local time in Rovaniemi is −5 hours relative to the local time in Singapore.
The local time in Christchurch is +4 hours relative to the local time in Singapore.

(a) When the time in Singapore is 6 am, find the local time in

(i) Rovaniemi

Answer: _____ [1]

(ii) Christchurch

Answer: _____ [1]

(b) When the local time in Rovaniemi on 2 September is 10 pm, what is the time and date in Singapore?

Answer: _____ [1]

6 Mr Singh used a tape of 52 m to cordon off a rectangular plot of land to plant vegetables. (Dimensions are integers.)

(a) What would be the largest possible area he could have?

Answer: _____ m^2 [1]

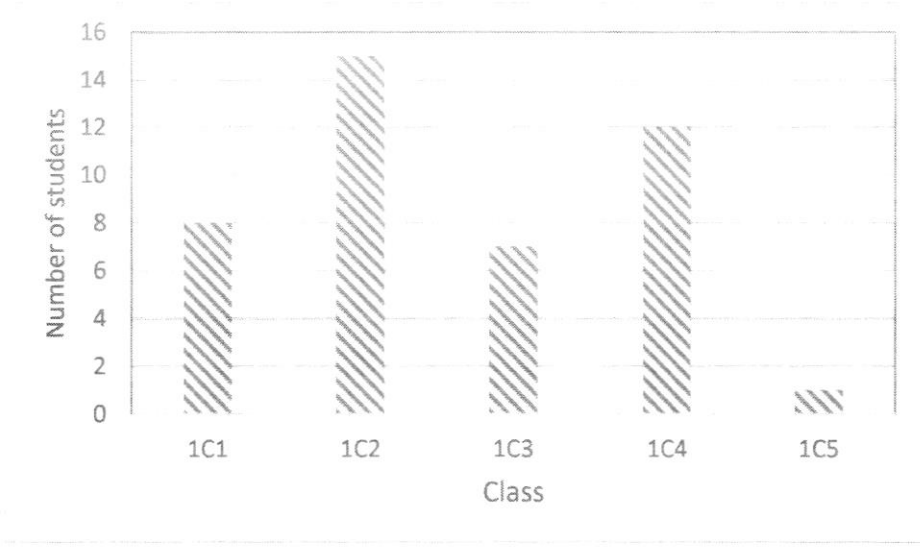
(b) State the dimensions of this largest possible area.

Answer: Length = _____ m, Breadth = _____ m [1]

(c) Mrs Tan bought more tapes and the shape of the plot of land was later altered from a rectangle to a circle. With the area of the plot remaining the same, find the radius of the circle?

Answer: _____ m [2]

7 The following table and bar graph show the number of students who owned at least one laptop at home.



(a) Use the information from the bar chart to find the value of p and q in the table below.

Class	1C1	1C2	1C3	1C4	1C5
Number of students who had at least one laptop at home.	8	15	7	p	q

Answer $p =$ _____

$q =$ _____ [2]

(b) Find the total number of students who had at least one laptop at home.

Answer : _____ [1]

(c) If the number of students in Class 1C1 was increased to 10, find the percentage increase in the total number of students.

Answer : _____ % [2]

8 The first four terms of a number sequence are $-8, -2, 4, 10$.

(a) Write down the 7^{th} term of the pattern.

Answer : _____ [1]

(b) Find an expression for the nth term of the sequence.

Answer : _____ [1]

(c) Find the term in the sequence when the number is 118.

Answer : _____ [1]

(d) Will there be a number pattern where the number is 89?
Explain your answer.

_____

_____

_____

_____

Answer : _____ [2]

9 **(a)** Given that $y = -2x - 4$, find the values of p and q in the following table.

x	-6	-4	0	2	4
y	p	4	-4	-8	q

Answer : $p =$ _____, $q =$ _____ [2]

(b) Using a scale of 2 cm to represent 1 unit on the x-axis and 1 cm to represent 1 unit on the y-axis, draw the graph of $y = -2x - 4$ for values of x from -6 to 4. [3]

(c) Using your graph, find the value of y when $x = -1.5$.

Answer : $y =$ _____ [1]

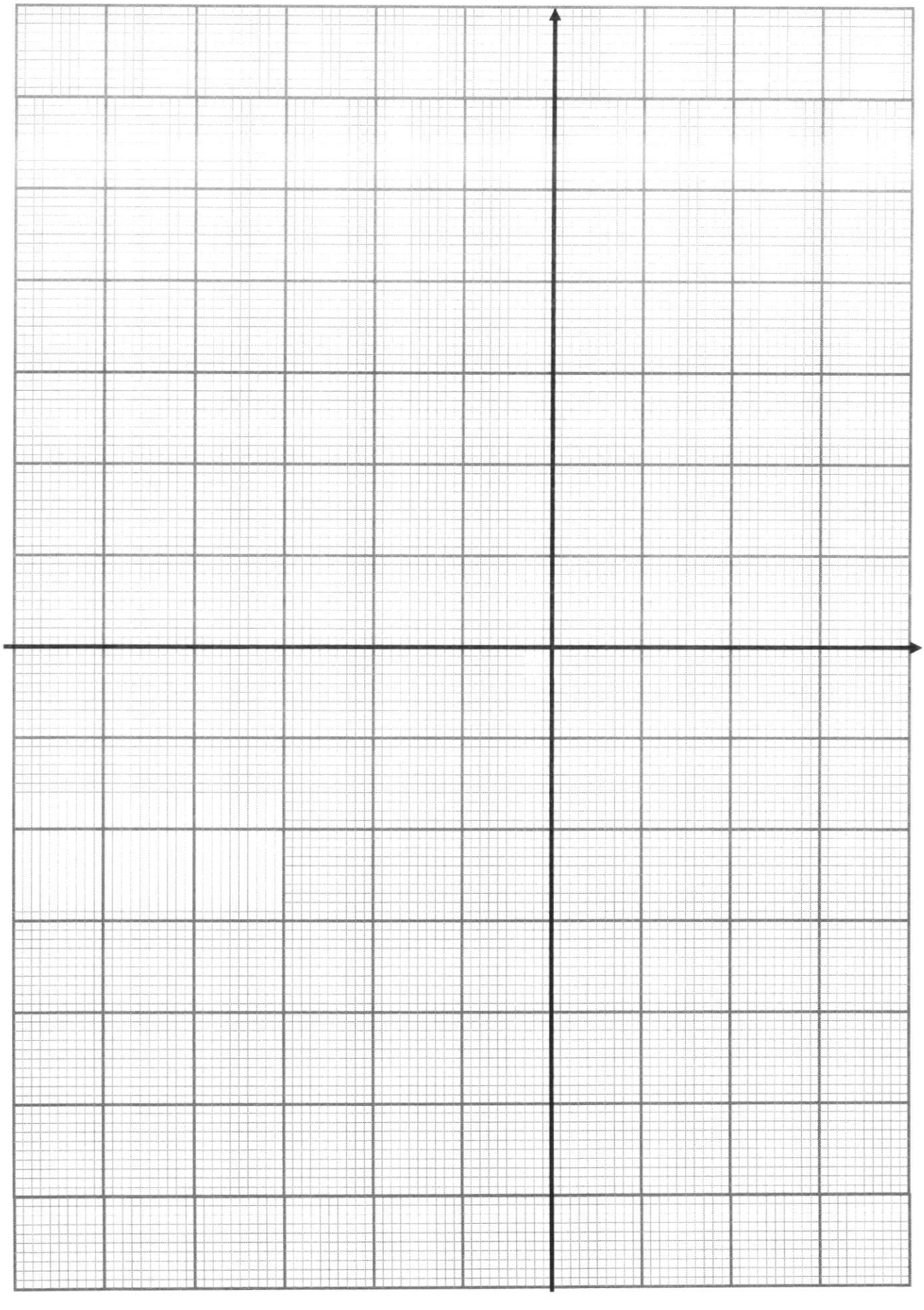
(d) Find the gradient of the graph.

Answer : _____ [1]

(e) A line parallel to the graph $y = -2x - 4$, cuts the y-axis at $y = 3$.
Write down the equation to this parallel line.

Answer : _____ [1]

Question 9

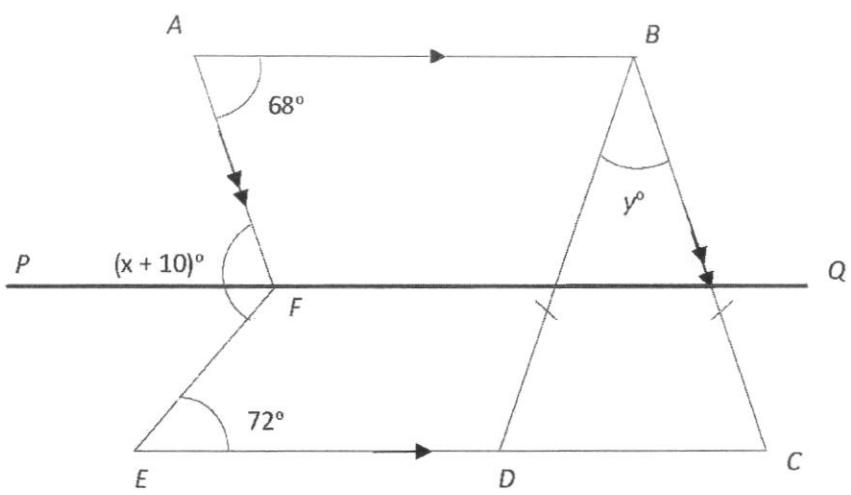


End of Paper

2022 Sec 1 Express Math EOY Paper 1 Marking Scheme

1a	$\sqrt{4}$	[A1]
1b	π or $\sqrt[3]{5}$ Any one of the answers	[A1]
2a	$\left[1\frac{2}{3}+\left(-\frac{1}{6}\right)\right]\div\frac{6}{7}\times\left(1\frac{4}{5}-2\frac{3}{10}\right)$ $=[\frac{5}{3}-\frac{1}{6}]\div\frac{6}{7}\times(\frac{9}{5}-\frac{23}{10})$ $=[\frac{10}{6}-\frac{1}{6}]\div\frac{6}{7}\times(\frac{18}{10}-\frac{23}{10})$ $=\frac{9}{6}\div\frac{6}{7}\times\left(-\frac{5}{10}\right)$ $=\frac{3}{2}\times\frac{7}{6}\times(-\frac{1}{2})$ $=\frac{7}{4}\times(-\frac{1}{2})$ $=-\frac{7}{8}$	[M0.5] [M0.5] [M0.5] [A0.5]
2b	-0.32777 =-0.328	[M1] [A1]
3a	$360 = 2^3 \times 3^2 \times 5$	[A1]
3ai	HCF = $2^3 \times 3 \times 5$ = 120	[A1]
3aii	m = 3	[A1]
3b	$x^4y^5z^2$	[A1]
4a	9:25	[B1]
4b	0.5km = 50 000 cm $8\frac{1}{10}$ m = 810 cm 20 cm 50 000 : 810 : 20 = 5000 : 81 : 2	[M1] [A1]
5a	$8x - 4y - 3x + 18y$ $= 5x + 14y$	[M1] [A1]
5b	$\frac{5x}{3}+7(\frac{1}{4}x-x+2x)$ $=\frac{5x}{3}+7(\frac{5}{4}x)$	[M1]

	$=\frac{5x}{3}+\frac{35}{4}x$ $=10\frac{5}{12}x$	[A1]
6a	$\frac{-5x+3y}{3}-\frac{y+3x}{8}$ $=\frac{8(-5x+3y)}{24}-\frac{3(y+3x)}{24}$ $=\frac{-40x+24y}{24}-\frac{3y+9x}{24}$ $=\frac{-40x+24y-3y-9x}{24}$ $=\frac{-49x+21y}{24}$	[M1] [A1]
6b	$\frac{3(x+1)}{2}+\frac{4(x-1)}{5}$ $=\frac{3x+3}{2}+\frac{4x-4)}{5}$ $=\frac{5(3x+3)}{10}+\frac{2(4x-4)}{10}$ $=\frac{15x+15+8x-8}{10}$ $=\frac{23x+7}{10}$	[M0.5] [M0.5] [A1]
7a	$8xy(8x+2z-3)$	[A1]
7bi	ax -ay	[A1]
7bii i	$28(165-65)$ $=28(100)$ $=2800$	[M1] [A1]
8a	decrease = $12 000 Percentage decrease = 10%	[M1] [A1]
8b	Interest = 6000 x 2% x 9/12 = $90	[M1] [A1]
9	360 / 15 = 24	[M1] [A1]
10a	5(2x -7)	[A1]
10b	$5(2x-7)=55$ $2x-7=11$	[M1] [M1]

	$2x = 18$ $x = 9$	[A1]
10c	AD= 9-3 = 6	[A1]
10d	$2(6 + 11)$ = 34 cm	[M1] [A1]
11a	$\frac{(-1) - (3)}{(-4) - (4)}$ = 0.5	[M1] [A1]
11b	y = 1	[A1]
11c	y = 0.5x + 1	[A1]
12a	$4(2x - 5) = 3x + 2$ $8x - 20 = 3x + 2$ $5x = 22$ $x = 4.4$	[M1] [A1]
12b	$1.2x = 6$ $x = 5$	[M1] [A1]
13	 $\angle ADP = 68^{\circ} (alt\ angles, AB \parallel EC)$ $\angle PDE = 72^{\circ} (alt\ angles, PQ \parallel EC)$	[M ½] [M ½]

	x + 10 = 68 + 72 x + 10 = 140 x = 130	[A1]
	$\angle BQD = 68°(corr\ angles, AD \parallel BC)$	[M1]
	$\angle DBC = 180^{\circ} - 2(68°)(sum\ of\ \ angles\ of\ isos.triangle)$ = 44°	
	y = 44	[A1]

2022 Sec 1 Express Math Paper 2 Marking Scheme

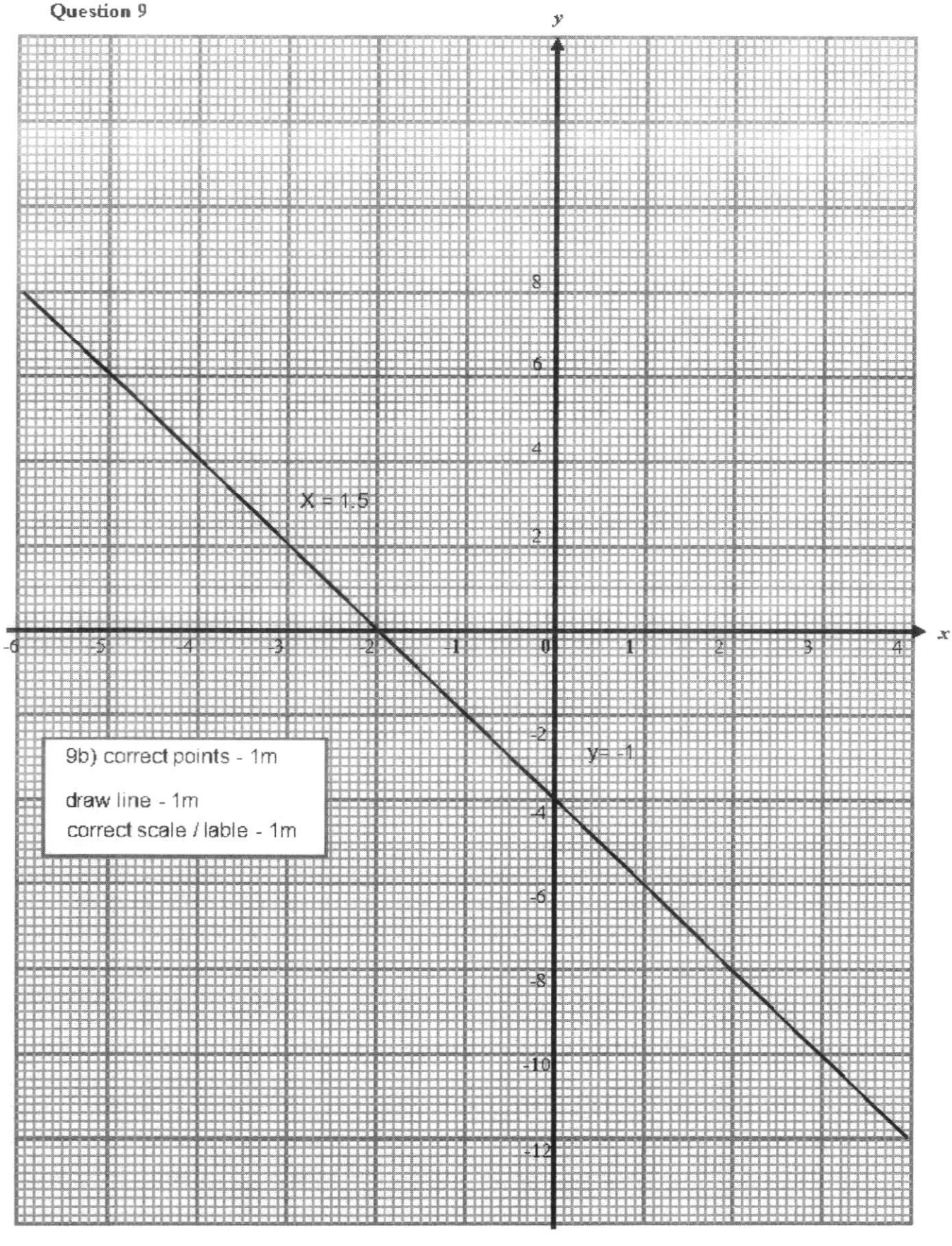
1a	Shop Voucher = $30 Price of TV after shop voucher = $770 Price of TV after member's discount = 75% x 770 = $577.50 Amt paid for TV = $577.50 + 20 = $597.50	[M ½] [M ½] [M ½] [A ½]
1bi	Downpayment = 10% x 2000 =$200	[M1] [A1]
1bii	Interest = 5% x 1800 x 2 = $180 Monthly instalment = (180 + 1800)/24 = $82.50	 [M1] [M1] [A1]
2a	Area of big circle = $\pi(17.5)^2$ = 306.25π mm^2 Area of small circle = $\pi(12.5)^2$ = 156.25π mm^2 Area of shaded figure = 150π = 471.239 = 471 mm^2 (3 sf)	 [M ½] [M ½] [A1]
2b	Volume of ice tube = 471.239 x 40 = 18 849.6 = 18 800 mm^3 (3 sf)	 [M1] [A1]
2c	18 849.6 mm^3 = 18 849.6 / 1000 = 18.849cm^3	 [M1]

	Mass of 1 ice tube = 18.849g No of ice tubes in a packet = 1000 / 18.849 = 53.053 = 53	 [M1] [A1]
3a	1 ext angle (adj. angles on a straight line) = 180 – 156 = 24° No of sides = 360 / 24 = 15	 [M1] [A1]
3b	Angle AOC = 360 / 15 = 24°	 [M1] [A1]
3c	Area of triangle AOC = ½ x 12.5 x 8 = 50 cm^2 Area of the polygon = 50 x 15 = 750 cm^2	 [M1] [A1]
4a	Dist between town A and town M = 0.016 x 30 x 60 = 28.8 km	 [M1] [A1]
4b	Time taken to travel from town M to town B = (60 – 28.8) / 0.025 = 1248 s = 20.8 min Total time taken = 30 + 20.8 = 50.8 min = 127/150 h Ave speed = 60 / (127/150) = 70.866 = 70.9 km/h (3 sf)	 [M1] [M1] [A1]

5ai	1am		[A1]
5aii	10am		[A1]
5b	3am 3 Sept		[A1]
6a	12 x 14 = 168 m²	or 13 x 13 = 169 m²	[A1]
6b	14 m x 12 m	or 13 m x 13 m	[A1]
6c	Radius $= \sqrt{168 \div \pi}$ = 7.3127 = 7.31 m (3 sf)	Radius $= \sqrt{169 \div \pi}$ = 7.33 m (3sf)	[M1] [A1]
7a	p = 12 q = 1		[A1] [A1]
7b	total = 8 + 15 + 7 + 12 + 1 = 43		[A1]
7c	Percentage increase = 2/43 x 100 = 4.6512 = 4.65% (3sf)		[M1] [A1]
8a	28		[A1]
8b	Nth term = 6n - 14		[A1]
8c	6n -14 = 118 6n = 132 n = 22		[A1]
8d	6n – 14 = 89 6n = 103 n = 17.2 Since n is not a whole number, there will not be a number pattern where the number is 89. OR Since 6n – 14 = 2(3n – 7), the numbers in the sequence will always be even. 89 is an odd number so there will not be a number pattern where the number is 89.		[M1] [A1] [M1] [A1]

9a	p = 8 q = -12	[A1] [A1]
9c	y = -1	[A1]
9d	gradient = -2	[A1]
9e	y = -2x + 3	[A1]

Question 9


y
x
8
6
4
2
-2
-4
-6
-8
-10
-12
-6
-5
-4
-3
-2
-1
0
1
2
3
4
X = 1.5
y= -1
9b) correct points - 1m
draw line - 1m
correct scale / lable - 1m