

Pre Public Examination

GCSE Mathematics (Edexcel style)

June 2017

Foundation Tier

Paper 3F

Worked Solutions

Name

Class

TIME ALLOWED

1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- **You are permitted to use a calculator in this paper.**
- Do all rough work in this book.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question on the Question Paper.
- **You are reminded of the need for clear presentation in your answers.**
- The total number of marks for this paper is **80**.

Question	Mark	Out of
1		1
2		3
3		2
4		2
5		3
6		4
7		4
8		3
9		3
10		3
11		3
12		4
13		2
14		3
15		5
16		4
17		3
18		2
19		3
20		4
21		6
22		4
23		3
24		6
Total		80

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

Question 1.

Write 89 786 correct to the nearest 1000

90000 31

.....
(Total 1 mark)

Question 2.

Ben buys three tickets to a music concert.

Each ticket costs £55 each.

Ben also has to pay a booking fee.

The booking fee is £2.25 per ticket.

Ben has £180 to spend.

Work out whether Ben has enough money to buy all three tickets and pay for the booking fee.

$$55 \times 3 = 165$$

$$2.25 \times 3 = 6.75 \quad M1$$

$$165 + 6.75 = 171.75 \quad A1$$

$$180 - 171.75 = 8.25$$

Yes Ben has enough money to buy all three tickets C1
and pay for booking fee. He will have £8.25 change.

(Total 3 marks)

Question 3.

A jar of sweets has a weight of 95g.

Some of the sweets are put into a small jar.

The rest are put into a large jar.

The sweets in the large jar weighs 25g more than the sweets in the small jar.

What is the weight of the sweets in the small jar?

$$95 - 25 = 70 \quad M1$$

$$70 \div 2 = 35$$

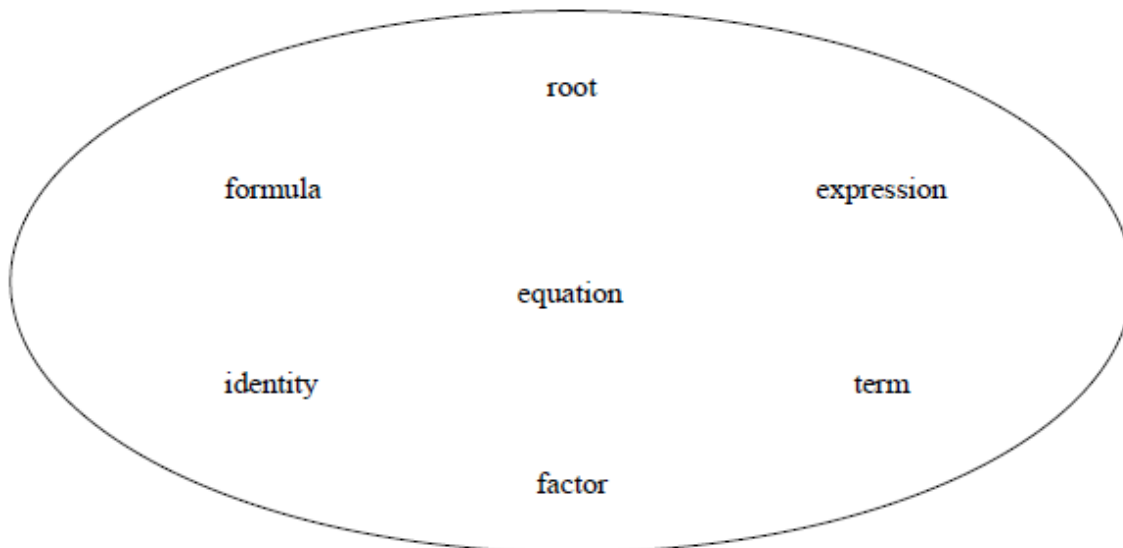
.....g

35

A1

(Total 2 marks)

Question 4.



Choose a word from those above that makes this statement correct.

(a) $4y^2$ is a *term* in $4y^2 + 2x$ **31**

(1)

Choose a word from those above that makes this statement correct.

(b) $(x + 2)$ is a *factor* of $5x + 10$ **31**

(1)

(Total 2 marks)

Question 5.

Bob carried out a survey of 100 people who buy tea.

He asked them about the tea they buy most.

The two-way table gives some information about his results.

	Tea bags	Packet tea	Instant tea	Total
50g	2	0	5	7
100g	35	20	5	60
200g	15	5	13	33
Total	52	25	23	100

Complete the two-way table.

$$2 + 35 + 15 = 52$$

$$100 - 52 - 25 = 23$$

$$25 - 20 = 5$$

$$60 - 35 - 20 = 5$$

$$23 - 5 - 5 = 13$$

$$2 + 0 + 5 = 7$$

$$15 + 5 + 13 = 33$$

B3 for all entries correct

B2 for 4 entries correct

B1 for 2 entries correct

(Total 3 marks)

Question 6.

There are 220 counters in a bag.

Each counter is either black or red.

There are three times as many black counters as red counters in the bag.

Suleman takes 40% of the red counters from the bag.

Work out the ratio of the number of black counters to the number of red counters now in the bag.

Give your ratio in its simplest form.

$$\begin{array}{l} B \quad R \\ 3 : 1 \end{array}$$

$$220 \div 4 = 55 \quad 1 \text{ part} \quad P1$$

$$\frac{40}{100} \times 55 = 22 \quad \text{Suleman takes.}$$

$$55 - 22 = 33 \quad M1$$

$$\text{Black counters} \quad 55 \times 3 = 165$$

$$165 : 33 \quad (\div 11) \quad M1$$

$$15 : 3 \quad (\div 3)$$

$$5 : 1 \quad A1$$

.....
(Total 4 marks)

Question 7.

(a) Find the value of r^3 when $r = 5$

$$5^3 = 5 \times 5 \times 5$$

$$125 \quad 31$$

(1)

(b) Find the value of $6x + 2y$ when $x = -2$ and $y = 7$

$$6 \times (-2) + 2 \times 7$$

$$-12 + 14$$

$$2 \quad 31$$

(1)

(c) There are s seats in standard class carriage and t seats in first class carriage.

A train has 6 standard class carriages and 3 first class carriages.

Write down an expression in terms of s and t for the number of seats in the train.

$$6s + 3t \quad M1, A1$$

(2)

(Total 4 marks)

Question 8.

The normal price of a watch is £55 in two shops, Dishes for U and Homeware.

Both shops have a sale.

In Dishes for U the normal price of the watch is reduced by £12.

In Homeware the normal price of the watch is reduced by 23%

Which shop is selling the watch for the cheaper price in the sale?

You must show your working.

Dishes for U

$$55 - 12 = \text{£}43 \quad \text{M1}$$

Homeware

$$\frac{23}{100} \times 55 = 12.65$$

$$55 - 12.65 = \text{£}42.35 \quad \text{M1}$$

Homeware is cheaper by 65p. C1

(Total 3 marks)

Question 9.

Jim has three rectangular pieces of wood.

Each piece of wood has length of 50 cm and a width of 25 cm.

The diagram shows one piece of wood.

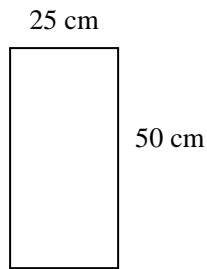
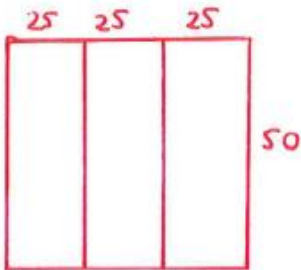


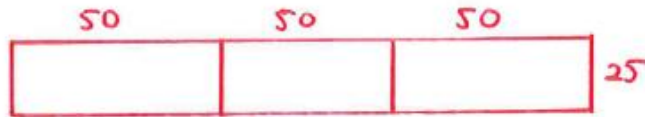
Diagram **NOT** accurately drawn

The three pieces of wood can be placed next to each other in different ways to make a larger rectangle.

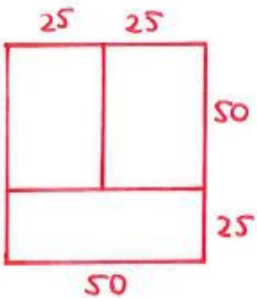
Work out the smallest possible perimeter of this larger rectangle.



$$75 + 75 + 50 + 50 = 250\text{cm} \quad P1$$



$$150 + 150 + 25 + 25 = 350\text{cm} \quad M1$$



$$25 + 25 + 50 + 25 + 50 + 25 + 50 = 250\text{cm}$$

The smallest possible perimeter of the large rectangle is 250cm. A1

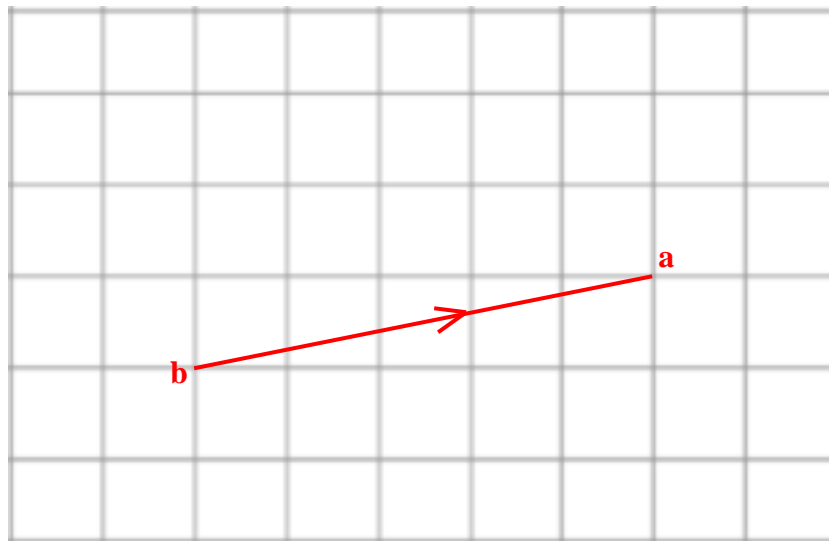
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(Total 3 marks)

Question10.

$$\mathbf{a} = \begin{pmatrix} 3 \\ 4 \end{pmatrix} \quad \mathbf{b} = \begin{pmatrix} -2 \\ 3 \end{pmatrix}$$

(a) Draw a diagram to show the resultant vector of $\mathbf{a} - \mathbf{b}$



B1

(1)

(b) Find the column vector of the resultant vector.

$$\begin{pmatrix} 3 \\ 4 \end{pmatrix} - \begin{pmatrix} -2 \\ 3 \end{pmatrix} = \begin{pmatrix} 3+2 \\ 4-3 \end{pmatrix} = \begin{pmatrix} 5 \\ 1 \end{pmatrix} \quad \text{M1}$$

$$\begin{pmatrix} 5 \\ 1 \end{pmatrix} \quad \text{A1}$$

(2)

(Total 3 marks)

Question11.

Work out the value of $\frac{a+b^2}{2a}$, where $a = 3.2 \times 10^6$ and $b = 8.6 \times 10^4$.

Give your answer in standard form to 3 significant figures.

$$= \frac{3.2 \times 10^6 + (8.6 \times 10^4)^2}{2 \times (3.2 \times 10^6)} \quad \text{M1}$$

$$= \frac{7399200000}{6400000} \quad \text{M1}$$

$$= 1156.125$$

$$1.16 \times 10^3 \quad \text{A1}$$

(Total 3 marks)

Question 12.

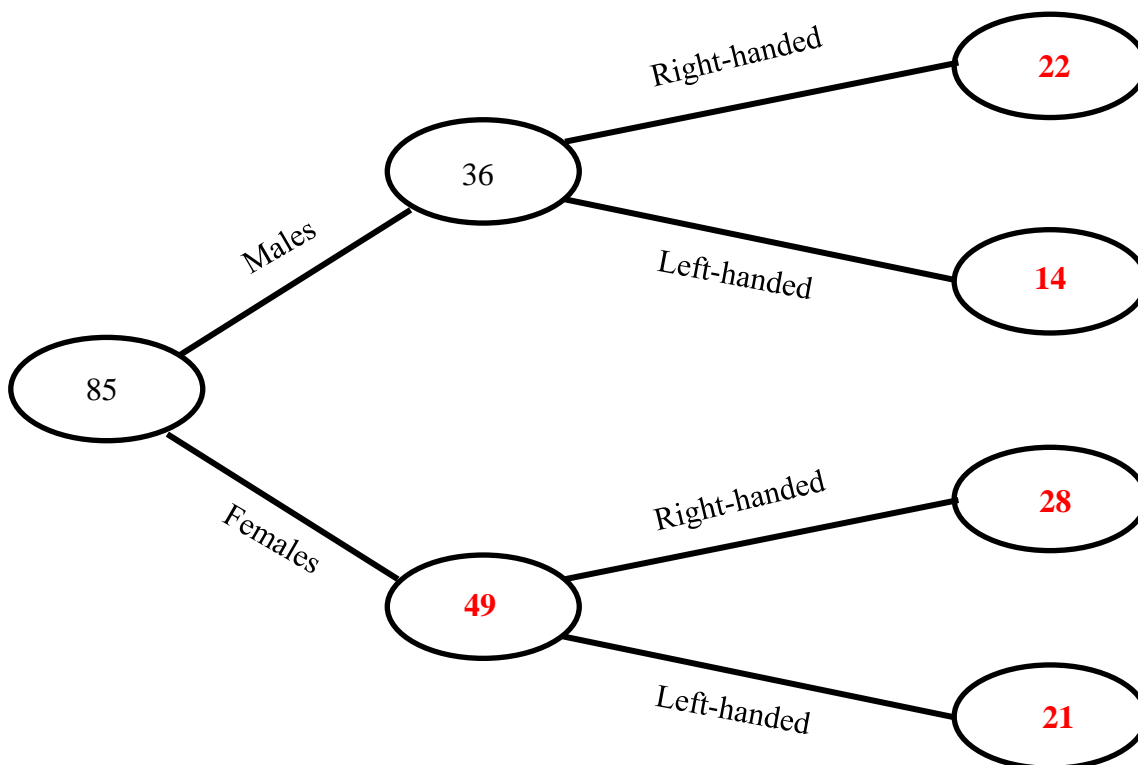
There are 85 members of a swimming club.

36 of the members are male.

$\frac{4}{7}$ of the female members are right-handed.

14 of the male members are left handed.

(a) Use this information to complete the frequency tree.



$85 - 36 = 49$

$\frac{4}{7} \times 49 = 28$

$49 - 28 = 21$

$36 - 14 = 22$

B2 for all correct entries

B1 for at least 3 correct entries

(2)

(b) One of the females is chosen at random.

Work out the probability that the female is left-handed.

$\frac{21}{49} = \frac{3}{7}$

M1 for denominator of 49

A1 for $\frac{21}{49}$ or $\frac{3}{7}$

(2)

(Total 4 marks)

Question 13.

Tom, Sam and Matt are counting drumbeats.

Tom hits a snare drum every 2 beats.

Sam hits a kettle drum every 5 beats.

Matt hits a bass drum every 8 beats.

Tom, Sam and Matt start by hitting their drums at the same time.

How many beats is it before Tom, Sam and Matt **next** hit their drums at the **same** time?

2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 (40)
5 10 15 20 25 30 35 (40)
8 16 24 32 (40) MI

40 AI

(Total 2 marks)

Question 14.

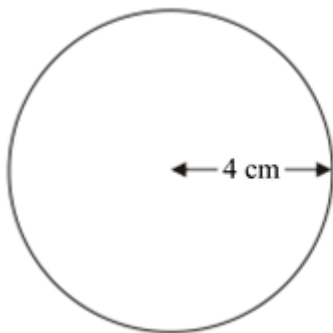


Diagram **NOT** accurately drawn

A circle has a radius of 4cm.

A square has a side of length 11cm.

Work out the difference between the area of the circle and the area of the square.

Give your answer correct to one decimal place.

$A = \pi r^2$
 $A = \pi 4^2$
 $A = 16\pi$
 $A = 50.26548246 \text{ cm}^2$

$11 \times 11 = 121 \text{ cm}^2$ MI

$121 - 50.26548246 = 70.73451754$ MI

70.7 cm². AI

(Total 3 marks)

Question 15.

$$-5 < n \leq 2$$

n is an integer.

(a) Write down all the possible values of n .

-4 -3 -2 -1 0 1 2 B2

(2)

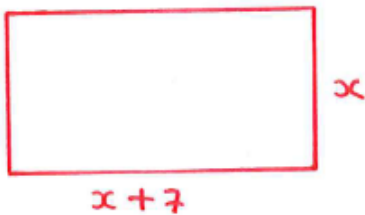
A rectangle has a width x cm.

The length of the rectangle is 7cm more than the width.

Both numbers are whole numbers.

The perimeter of the rectangle is less than 64cm

(b) Find the greatest possible value of x .



$$\begin{aligned}x + 7 + x + 7 + x + x &< 64 \\4x + 14 &< 64 \quad \text{M1} \\4x &< 50 \\x &< \frac{50}{4} \quad \text{M1} \\x &< 12.5\end{aligned}$$

12 A1

(3)

(Total 5 marks)

Question 16.

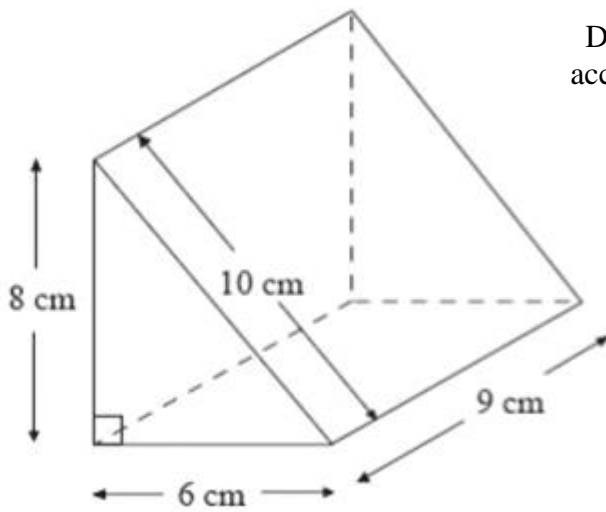


Diagram **NOT** accurately drawn

Work out the surface area of the triangular prism.
State the units with your answer.

$$\frac{8 \times 6}{2} = 24 \text{ cm}^2 \quad \text{M1}$$

$$24 \times 2 = 48 \text{ cm}^2$$

$$10 \times 9 = 90 \text{ cm}^2$$

$$9 \times 6 = 54 \text{ cm}^2 \quad \text{M1}$$

$$8 \times 9 = 72 \text{ cm}^2 \quad \text{M1}$$

$$48 + 90 + 54 + 72 = 264 \text{ cm}^2 \quad \text{A1}$$

(Total 4 marks)

Question 17.

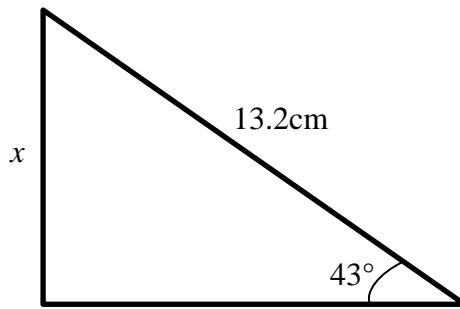


Diagram **NOT** accurately drawn

Work out the value of x .
Give your answer correct to 3 significant figures.

$$\sin 43 = \frac{x}{13.2} \quad \text{M1}$$

$$13.2 \sin 43 = x \quad \text{M1}$$

$$x = 9.002378353$$

$$x = \underline{9.00\text{cm}} \quad \text{A1}$$

(Total 3 marks)

Question 18.

A is the point with coordinates (7, 12)

B is the point with coordinates (-5, d)

The midpoint of the line is (1, 7.5)

Work out the value of d .

$$\frac{12 + d}{2} = 7.5 \quad \text{M1}$$

$$12 + d = 15$$

$$d = 15 - 12$$

$$d = 3$$

$$d = \underline{3} \quad \text{A1}$$

(Total 2 marks)

Question 19.

Niel, Dan and Adam are friends.

Their ages are in the ratio 9 : 3 : 8

Niel is 6 years older than Adam.

What are their ages?

$$\begin{array}{ccc} N & D & A \\ 9 & : & 3 & : & 8 \end{array}$$

$$9 - 8 = 1 \text{ is } 6 \text{ years. } M1$$

$$9 \times 6 = 54 \text{ Niel}$$

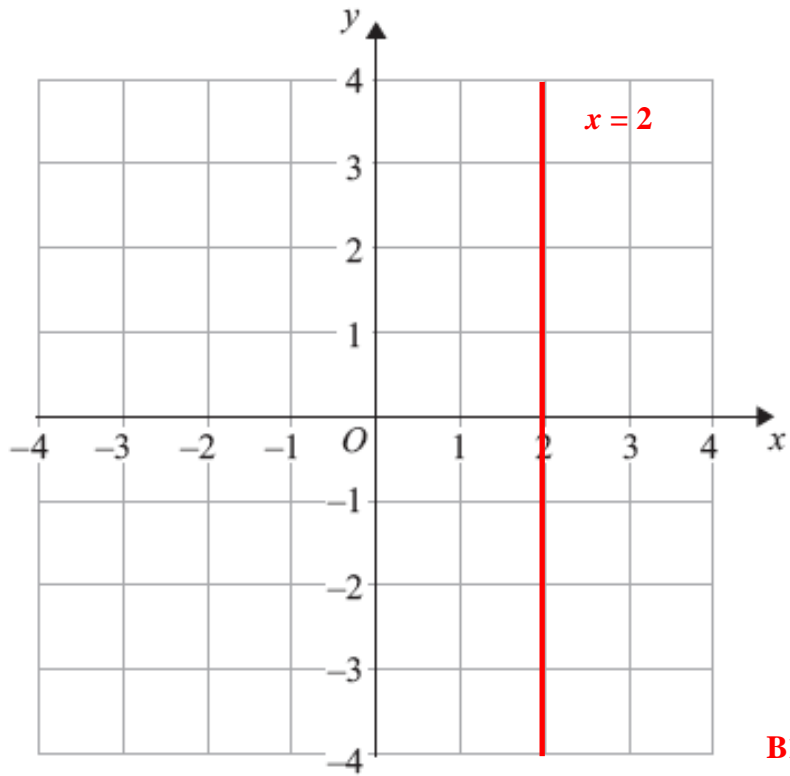
$$3 \times 6 = 18 \text{ Dan } M1$$

$$8 \times 6 = 48 \text{ Adam}$$

Niel..... 54
Dan..... 18
Adam..... 48 A1

(Total 3 marks)

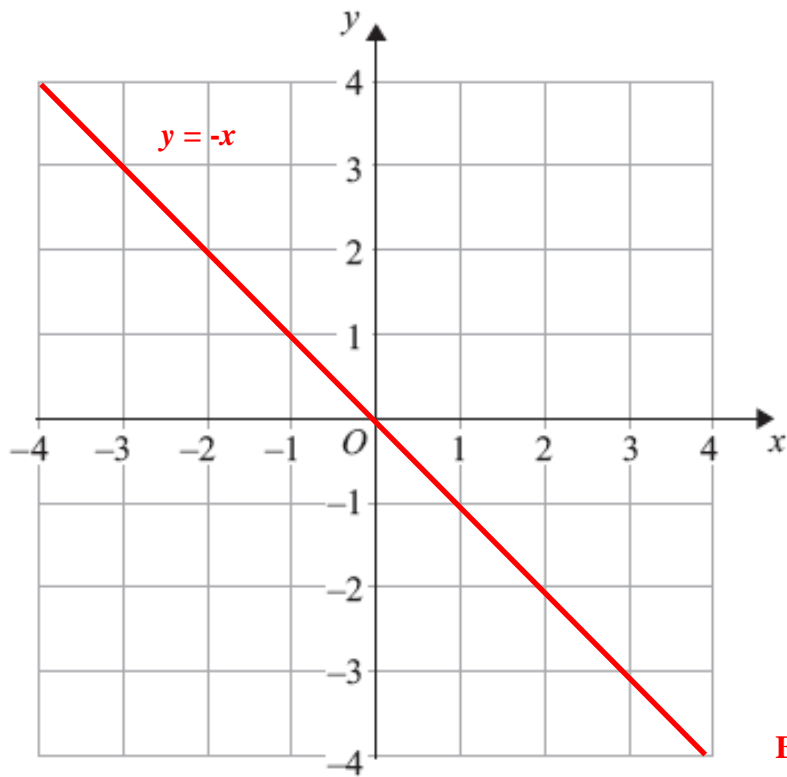
Question 20.



B1

(a) On the grid above, draw the line $x = 2$

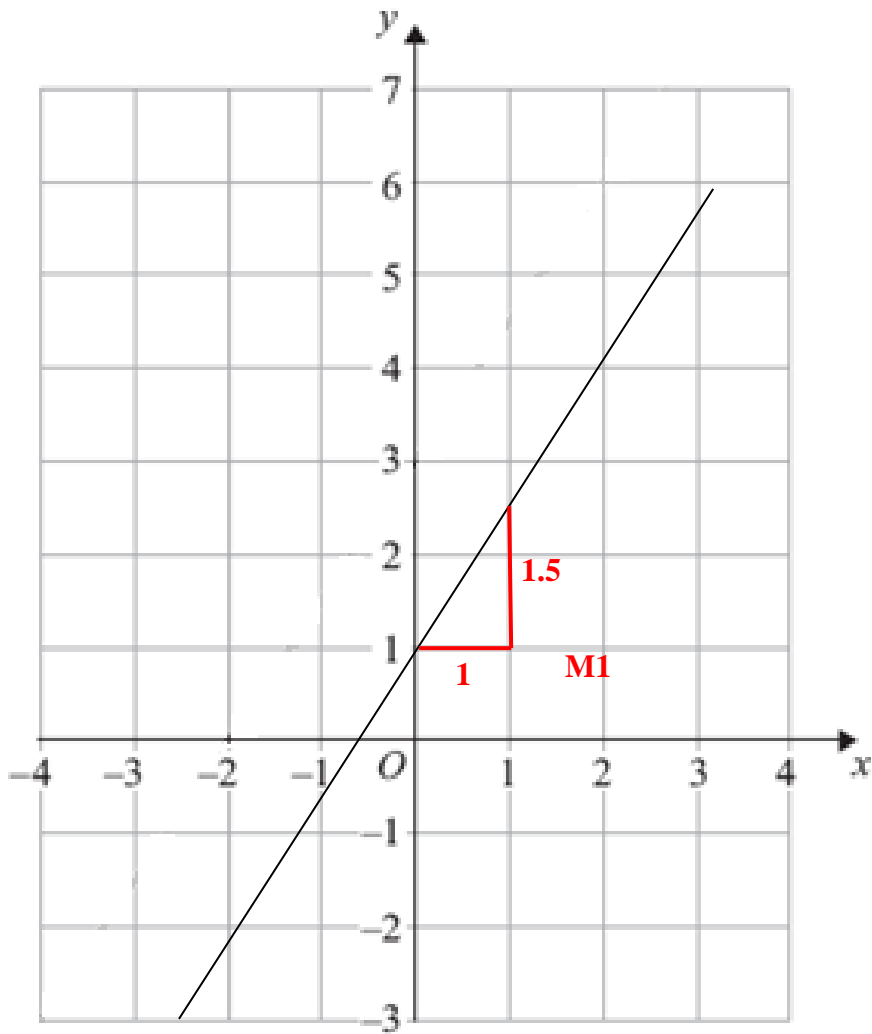
(1)



B1

(b) On the grid above, draw the line $y = -x$

(1)



(c) Find the gradient of the straight line drawn on this grid.

$$g = \frac{1.5}{1}$$

$$\text{gradient} = 1.5$$

or

$$(0, 1) \quad (2, 4)$$

$$\frac{4-1}{2-0} = \frac{3}{2}$$

1.5 A1

(2)

(Total 4 marks)

Question 21.

Fred has a recipe for 30 biscuits.

Here is a list of ingredients for 30 biscuits.

Ingredients for 30 biscuits	
Self-raising flour	230g
Butter	150g
Caster sugar	100g
Eggs	2

Fred wants to make 45 biscuits.

(a) Complete his new list of ingredients for 45 biscuits.

$$30 \div 2 = 15$$

$$15 + 15 + 15 = 45 \quad M1$$

$$230 + 115 = 345$$

$$150 + 75 = 225 \quad M1$$

$$100 + 50 = 150$$

$$2 + 1 = 3$$

Self-raising flour..... 345g
Butter..... 225g
Caster sugar..... 150g
A1 Eggs..... 3

(3)

Gill has only 1 kilogram of self-raising flour.

She has plenty of the other ingredients.

(b) Work out the maximum number of biscuits that Gill could bake.

$$1\text{kg} = 1000\text{g} \quad M1$$

$$230 \div 30 = 7.6 \quad M1$$

$$1000 \div 7.6 = 130.434 \dots$$

130 A1

(3)

(Total 6 marks)

Question 22.

The diagram shows a circle with centre O and radius 2.5 cm.

TA is a tangent to the circle, of length 6 cm.

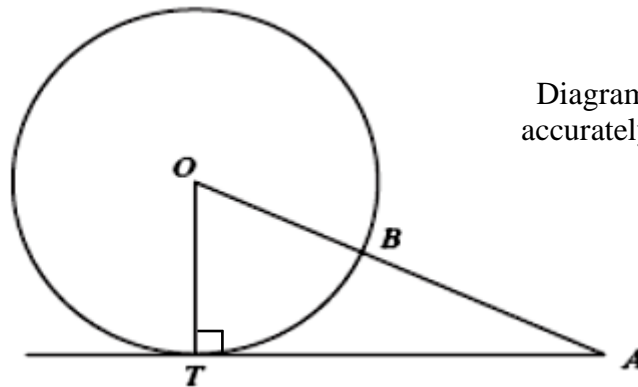


Diagram **NOT**
accurately drawn

The line from A to the centre O of the circle cuts the circumference at B .

Calculate the length of AB .

$$6^2 + 2.5^2 = OA^2 \quad M1$$

$$42.25 = OA^2 \quad M1$$

$$OA = 6.5 \quad M1$$

$$6.5 - 2.5 = 4 \quad A1$$

(Total 4 marks)

Question 23.

Solve the simultaneous equations

$$\begin{array}{r} 5x + 2y = 22 \quad \times 2 \\ 10x + 9y = 59 \quad (-) \\ \hline 10x + 4y = 44 \quad \text{M1} \\ 5y = 15 \\ y = \frac{15}{5} \\ y = 3 \quad \text{M1} \end{array}$$

Substitute $y = 3$ into $5x + 2y = 22$

$$5x + 2 \times 3 = 22$$

$$5x = 22 - 6$$

$$5x = 16$$

$$x = \frac{16}{5}$$

$$x = 3.2 \quad \text{A1}$$

(Total 3 marks)

Question 24.

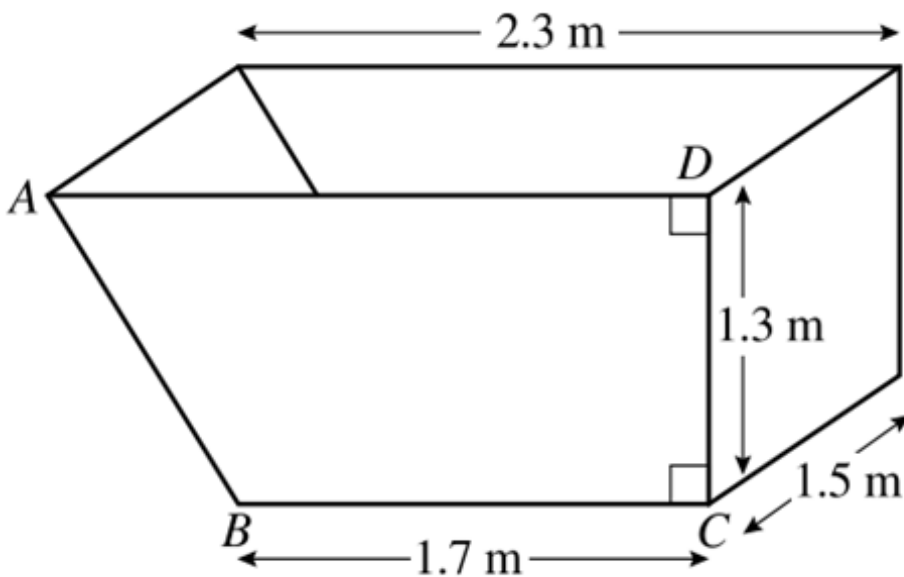


Diagram NOT accurately drawn

A skip is in the shape of a prism with cross section ABCD.

$AD = 2.3\text{m}$, $DC = 1.3\text{m}$ and $BC = 1.7\text{m}$.

The width of the skip is 1.5m .

(a) Calculate the volume of the skip.

Area of trapezium

$$\frac{1.7 + 2.3}{2} \times 1.3 = 2.6 \text{ M1}$$

Volume:

$$2.6 \times 1.5 = 3.9 \text{ m}^3 \text{ M1}$$

.....
 $3.9 \text{ m}^3 \text{ A1}$

(3)

(b) Mr Brown has hired the skip to get rid of some rubbish from his garden.

The rubbish has a volume of 420cm^3 .

Will it all fit into the skip?

You must explain your answer.

.....
 3.9 m^3 in cm^3 is $3.9 \times 100 \times 100 \times 100 \text{ M1}$

$$= 3900000 \text{ cm}^3 \text{ M1}$$

.....
 Yes the rubbish from the garden will fit into the skip. C1

(3)

(Total 6 marks)

TOTAL FOR PAPER IS 80 MARKS