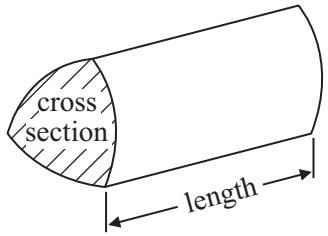
2016 Non Calculator Test 6 Name: _____

GCSE Mathematics 1MA0

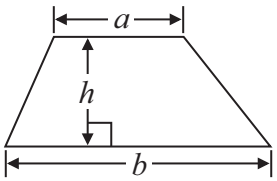
Formulae: Higher Tier

You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

Volume of prism = area of cross section × length

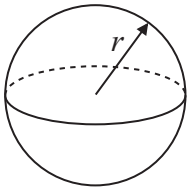


Area of trapezium = $\frac{1}{2}(a + b)h$



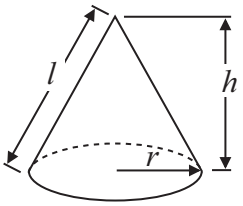
Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$

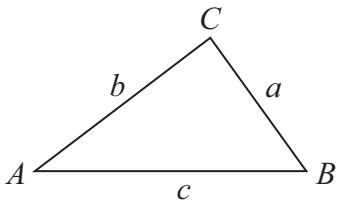


Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = πrl



In any triangle *ABC*



The Quadratic Equation
The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

Sine Rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine Rule $a^2 = b^2 + c^2 - 2bc \cos A$

Area of triangle = $\frac{1}{2}ab \sin C$

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

You must NOT use a calculator.

1 (a) Work out $\frac{1}{7} \times \frac{2}{3}$

.....

(1)

(b) Work out $\frac{3}{5} - \frac{1}{3}$

.....

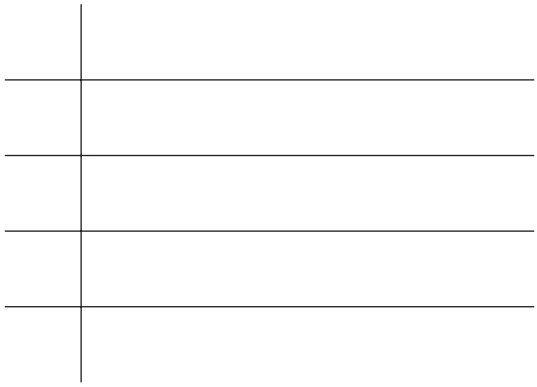
(2)

(Total for Question 1 is 3 marks)

2 Here are the times, in minutes, that 20 children took to walk to school.

13	21	19	27	31	5	23	29	18	25
34	15	28	23	22	40	16	19	32	9

Draw an ordered stem and leaf diagram for these times.



Key:

(Total for Question 2 is 3 marks)

3 50 people each did one activity at a sports centre.

Some of the people went swimming.
Some of the people played squash.
The rest of the people used the gym.

21 of the people were female.
6 of the 8 people who played squash were male.
18 of the people used the gym.
9 males went swimming.

Work out the number of females who used the gym.

.....

(Total for Question 3 is 4 marks)

4 Mr Brown and his 2 children are going to London by train.

An adult ticket costs £24
A child ticket costs £12

Mr Brown has a Family Railcard.

Family Railcard gives

$\frac{1}{3}$ off adult tickets

60% off child tickets

Work out the total cost of the tickets when Mr Brown uses his Family Railcard.

£.....

(Total for Question 4 is 4 marks)

5 Rebecca wants to find out how many books people buy.
She is going to use a questionnaire.

Design a suitable question for Rebecca to use in her questionnaire.

(Total for Question 5 is 2 marks)

6 (a) Expand $2m(m + 3)$

.....

(1)

(b) Factorise fully $3xy^2 - 6xy$

.....

(2)

(Total for Question 6 is 3 marks)

***7** The diagram shows the plan of a small field.

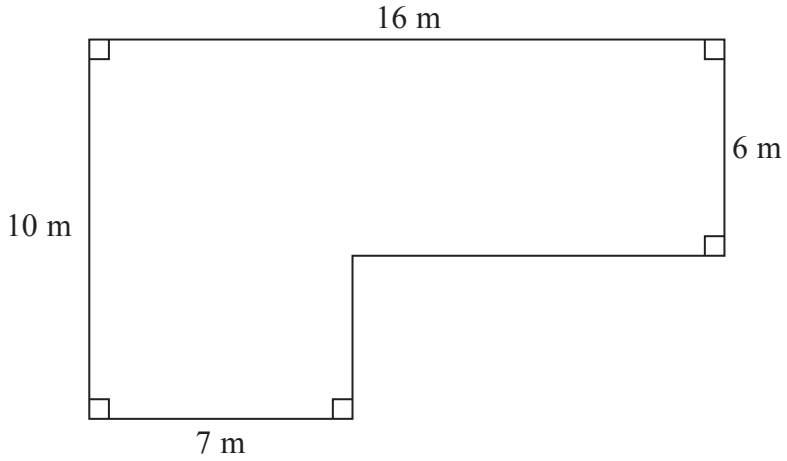


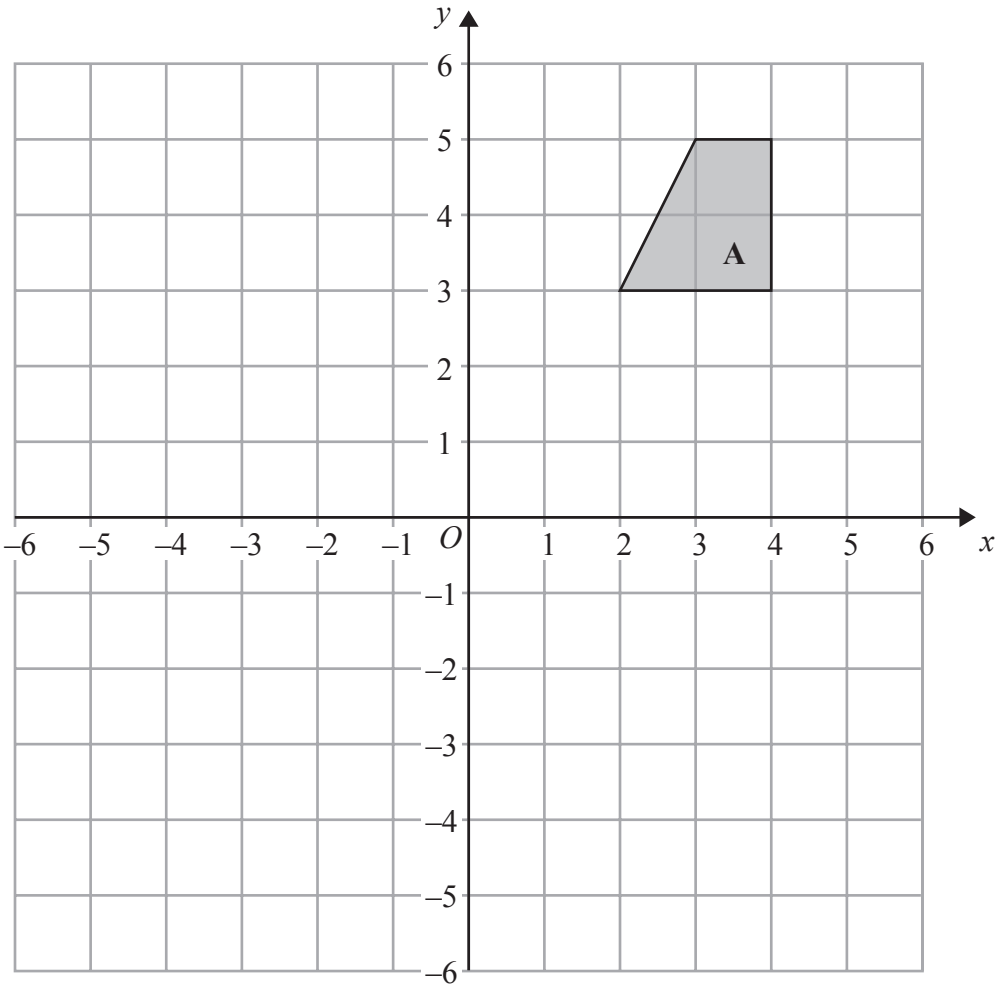
Diagram **NOT** accurately drawn

Kevin is going to keep some pigs in the field.
Each pig needs an area of 36 square metres.

Work out the greatest number of pigs Kevin can keep in the field.

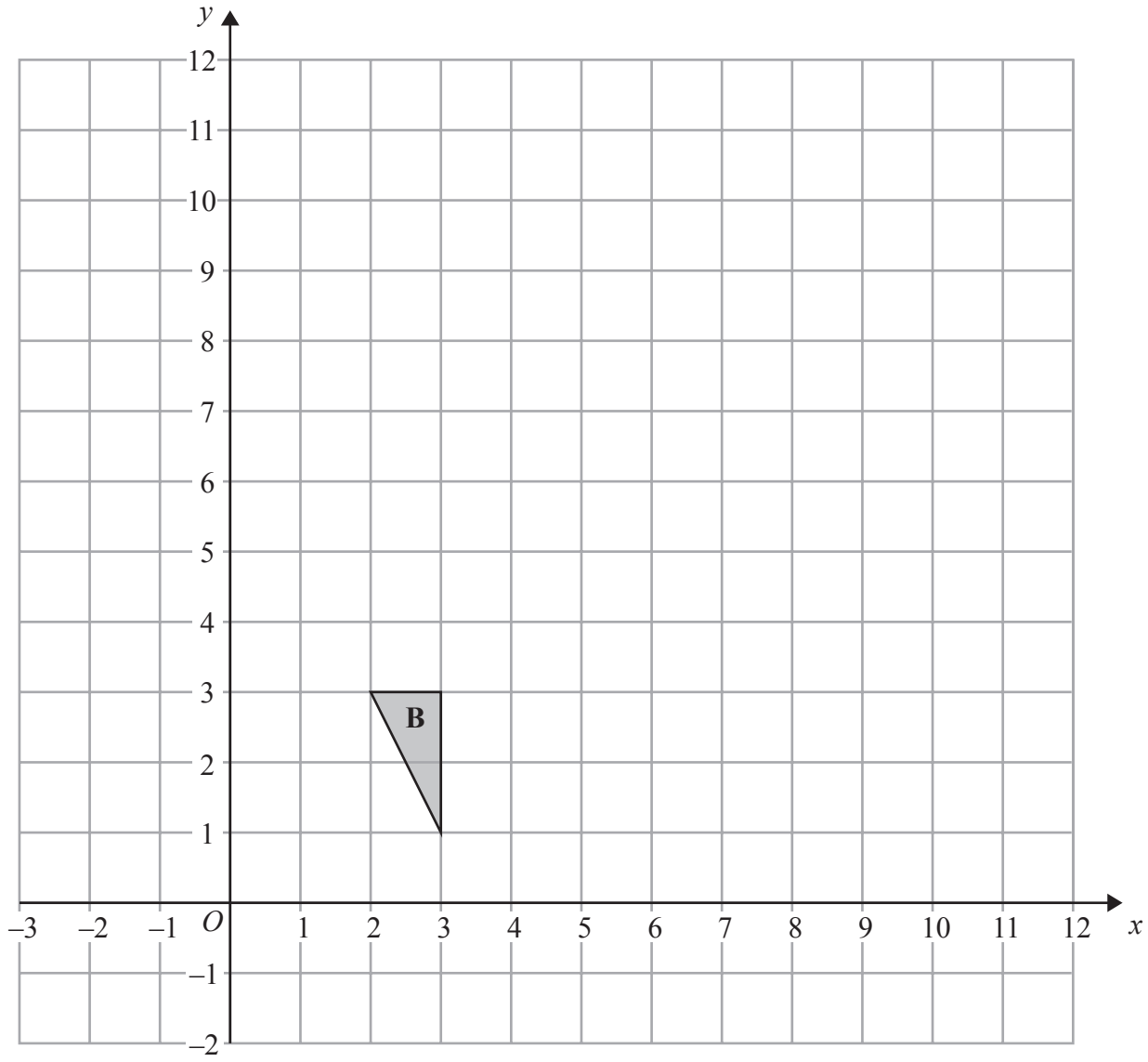
(Total for Question 7 is 4 marks)

8



(a) On the grid, rotate shape **A** 180° about the point (1, 1).

(2)



(b) On the grid, enlarge triangle **B** by scale factor 3, centre (0, 0).

(2)

(Total for Question 8 is 4 marks)

***9** Milk is sold in two sizes of bottle.

A 4 pint bottle of milk costs £1.18
A 6 pint bottle of milk costs £1.74

Which bottle of milk is the best value for money?
You must show all your working.

(Total for Question 9 is 3 marks)

10

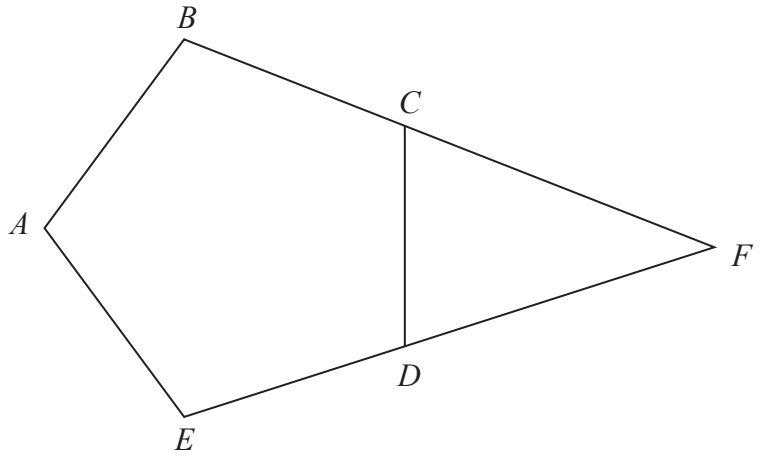


Diagram **NOT** accurately drawn

ABCDE is a regular pentagon.
BCF and *EDF* are straight lines.

Work out the size of angle *CFD*.
You must show how you got your answer.

.....°

(Total for Question 10 is 3 marks)

11 You can change temperatures from °F to °C by using the formula

$$C = \frac{5(F - 32)}{9}$$

F is the temperature in °F.
C is the temperature in °C.

The minimum temperature in an elderly person's home should be 20 °C.

Mrs Smith is an elderly person.
The temperature in Mrs Smith's home is 77 °F.

*(a) Decide whether or not the temperature in Mrs Smith's home is lower than the minimum temperature should be.

(3)

(b) Make F the subject of the formula $C = \frac{5(F - 32)}{9}$

.....

(3)

(Total for Question 11 is 6 marks)

***12**

Competition

a prize every 2014 seconds

In a competition, a prize is won every 2014 seconds.

Work out an estimate for the number of prizes won in 24 hours.
You must show your working.

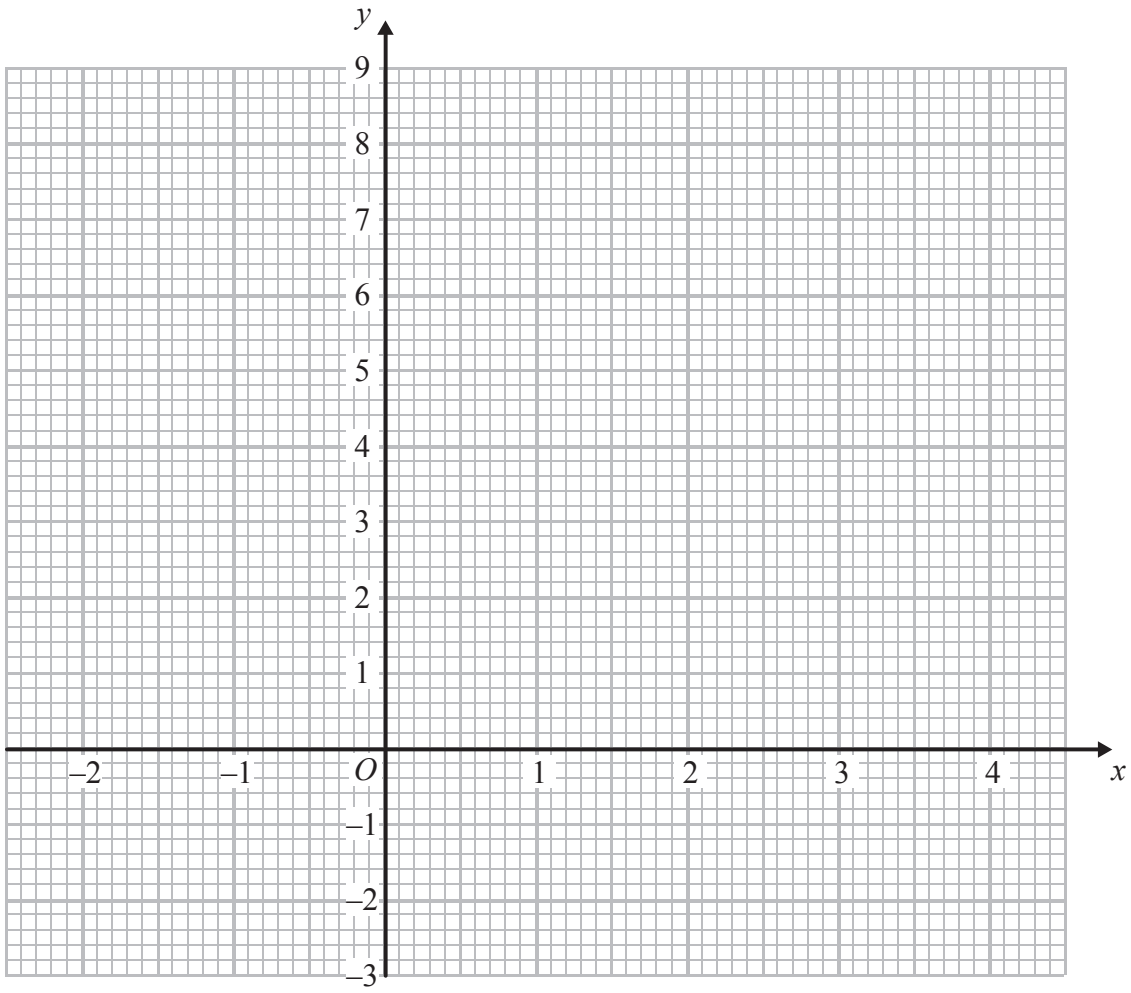
(Total for Question 12 is 4 marks)

13 (a) Complete the table of values for $y = x^2 - 2x - 1$

x	–2	–1	0	1	2	3	4
y	7			–2	–1		

(2)

(b) On the grid, draw the graph of $y = x^2 - 2x - 1$ for values of x from –2 to 4



(2)

(c) Solve $x^2 - 2x - 1 = x + 3$

.....

(2)

(Total for Question 13 is 6 marks)

14 (a) Write down the value of 10^0

.....

(1)

(b) Write down the value of 10^{-2}

.....

(1)

(c) Write these numbers in order of size.
Start with the smallest number.

2.73×10^3 27.3×10^{-3} 273×10^2 0.00273

.....

(2)

(Total for Question 14 is 4 marks)

15 Solve the simultaneous equations

$$4x + y = 25$$
$$x - 3y = 16$$

$x =$ .....

$y =$ .....

(Total for Question 15 is 3 marks)

16 (a) Simplify $(3x^2y^4)^3$

.....

(2)

(b) Simplify $\dfrac{x^2 - 9}{2x^2 + 5x - 3}$

.....

(3)

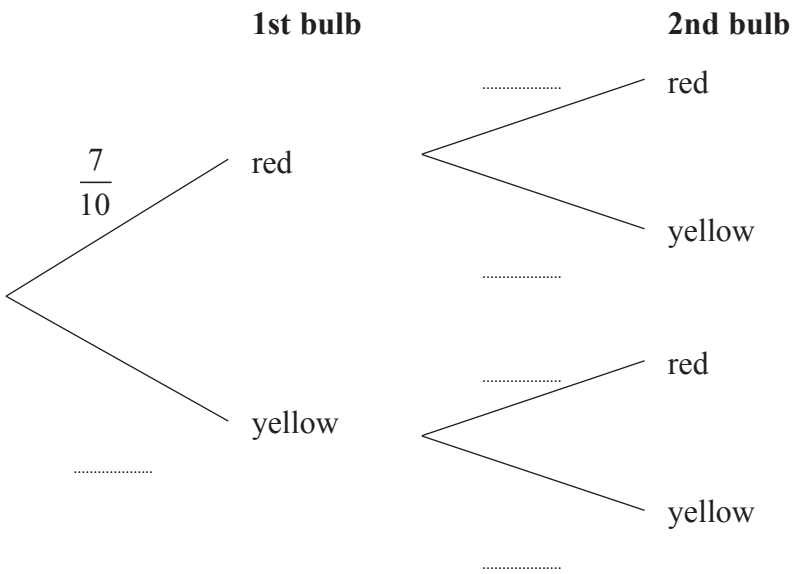
(Total for Question 16 is 5 marks)

17 Yvonne has 10 tulip bulbs in a bag.

7 of the tulip bulbs will grow into red tulips.
3 of the tulip bulbs will grow into yellow tulips.

Yvonne takes at random two tulip bulbs from the bag.
She plants the bulbs.

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that at least one of the bulbs will grow into a yellow tulip.

.....

(3)

(Total for Question 17 is 5 marks)