St Mary's School
CAMBRIDGE

Year 10 Maths
Sample Entrance Examination

Time allowed: 60 minutes

Name: _____

Total : 68 marks

INSTRUCTIONS

1. You may **NOT** use a calculator.
2. Work through as many questions as you can.
3. Full marks will be given to solutions that show a complete method.
4. If you do not understand a question, miss it out and go on to the next one.
5. When you have done all that you can, return to the question(s) that you have missed.

1.For each expression, multiply out the brackets and simplify:

(a) $5c + 2(3c - 1) =$

……(2)

(b) $7p - 5(4 - p) =$

……(2)

(Total 4 marks)

2. Solve these equations. Show your method clearly.

(a) $3(x + 6) = 5x + 12$

(b) $5p - 8 = 7p - 9$

$x =$ ……

$p =$ ……

(Total 6 marks)

3. Solve this number puzzle. Show all your working clearly.

Jack and Harry think of the same number.
Jack adds 2 to his number, and then multiplies by 5.
Harry multiplies his number by 7 and then subtracts 6.
They both get the same answer.
What number did they both think of?

……

(Total 4 marks)

4.Maya earns £6.50 per hour.

Her pay is increased by 4%. Calculate her new hourly rate of pay.

……..…… (3)

5. Work these out.

(a) $15\frac{3}{4} - 4\frac{2}{3}$

(b) $8 \div \frac{4}{5}$

…… ……

(Total 5 marks)

6. Change each of these to a decimal. State whether your answer is a terminating or recurring decimal.

(a) $\frac{3}{8}$

…… **(2)**

(b) $\frac{5}{12}$

…… **(3)**

(Total 5 marks)

7. A regular polygon has 20 sides. Calculate

(a) the size of each exterior angle

……° (2)

(b) the size of each interior angle

……° (2)

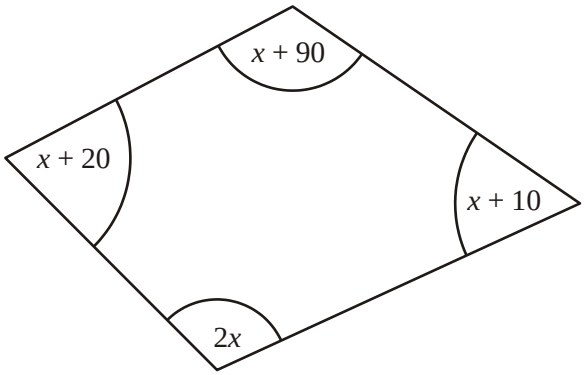

Diagram **NOT** accurately drawn

The sizes of the angles, in degrees, of the quadrilateral are

$x + 10$
$2x$
$x + 90$
$x + 20$

(a) Use this information to write down an equation in terms of x.

..... (2)

(b) Use your answer to part (a) to work out the size of the smallest angle of the quadrilateral.

..... ° (3)

(Total 9 marks)

8. On the diagram below, draw the following journey

A to Q: 55 km on a bearing of 070°

Q to R: 30 km on a bearing of 325°

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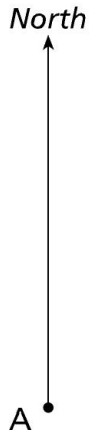


Scale : 1cm to 10 km

(Total 4 marks)

9. Calculate the average speed of a car which travels 165 miles in 3 hours

…… m.p.h.

(Total 2 marks)

10. The cheetah is the fastest mammal in the world. It can run at a maximum speed of 29 metres per second.
If it maintained this speed, how far would it travel in one minute?

……m

(Total 2 marks)

11. Calculate the time taken by a cyclist who goes 70 km at a speed of 20 km/h

…… hours

(Total 2 marks)

12. This table shows information about the weight of apples picked from different trees in an orchard.

Weight of apples in grams	Frequency		
0–10	3		
10–20	20		
20–30	10		
30–40	9		
40–50	8		

(a) Write down the class interval that contains the median.

……

(b) What is the modal interval?

…… ……

(c) Calculate an estimate of the mean weight of apples picked from a tree.

…… g

(Total 6 marks)

13. Mr Brown sows 200 flower seeds.

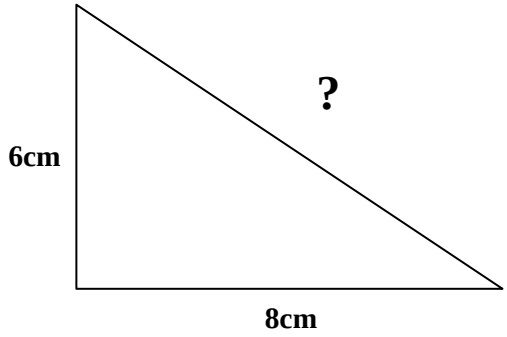
For each flower seed the probability that it will produce a flower is 0.85

Work out an estimate for the number of these flower seeds that will produce a flower.

..... (2)

(Total 2 marks)

14. Calculate the length of the hypotenuse of this triangle.



…… cm

(3)

(Total 3 marks)

15. Mary bakes a cake with a diameter of 18cm.

(a) Work out the area of the top of the cake. Leave your answer in terms of π.

……cm^2

(2)

(b) What length of ribbon would Mary need to fit exactly around the circumference of the cake? Leave your answer in terms of π.

……cm

(1)

(Total 3 marks)

16. A spinner is coloured red, yellow, blue and white.

The probability that it shows red is $\frac{1}{8}$, yellow $\frac{1}{6}$, and blue $\frac{1}{4}$.

What is the probability that it shows

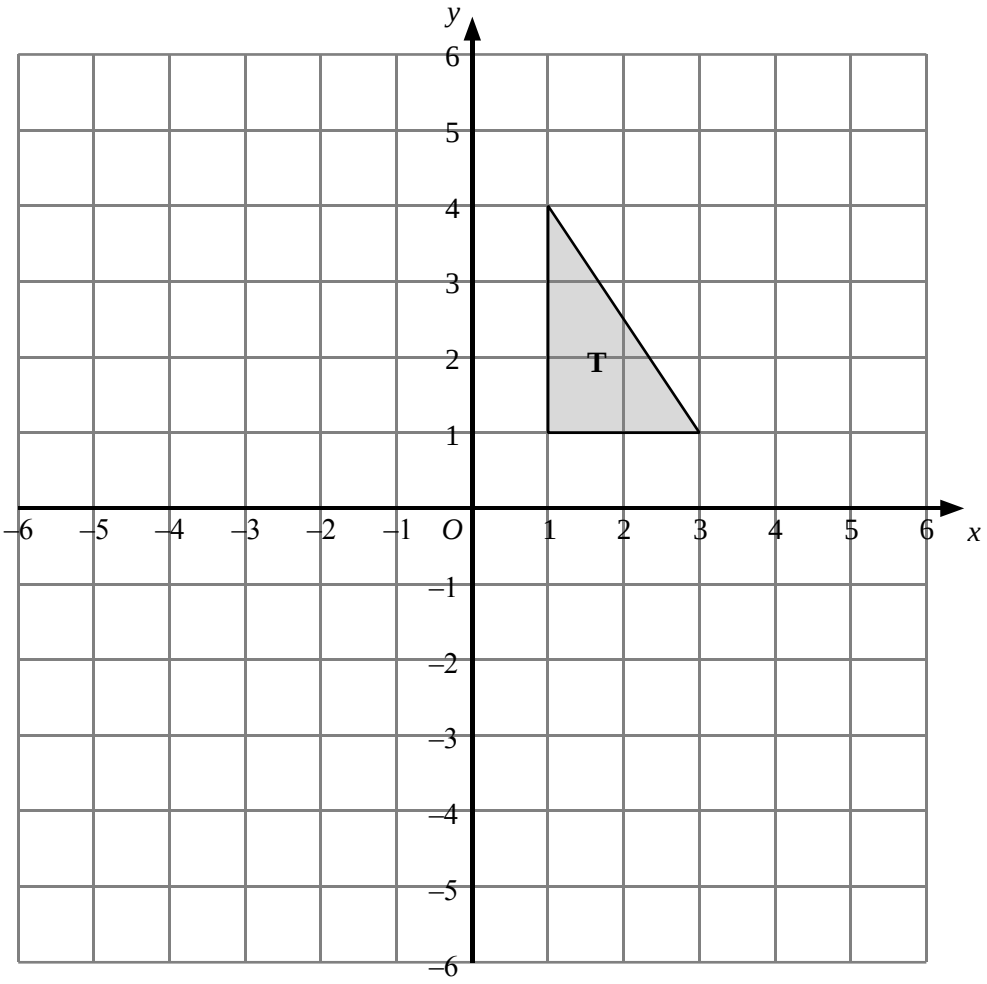
(a) red or yellow

(b) blue or white

…… ……

(Total 5 marks)

17.



Triangle **T** has been drawn on the grid.

(a) Reflect triangle **T** in the *x*-axis.
Label the new triangle **A**.

(1)

(b) Translate triangle **T** using the vector $\begin{pmatrix} -4 \\ +2 \end{pmatrix}$.

Label the new triangle D.

(2)

(Total 3 marks)

End of test – now go back and check your work.