FOUNDED 1900
THE ENGLISH SCHOOL
A SECOND CENTURY OF EXCELLENCE

YEAR 2 MID-PROGRAMME ENTRY EXAMINATIONS 2022

MATHEMATICS **SATURDAY 4th JUNE 2022**

Time allowed: 2 hours

Instructions to candidates

Answer all the questions in the spaces provided.

Without sufficient working, correct answers may be awarded no marks.

Information to candidates

This paper has 27 questions.

There are 20 pages in this question paper.

Full marks may be obtained for answers to all questions.

The total marks for this paper is 120.

The marks for each question is shown in round brackets, e.g. **(2)**

Advice for candidates

Write your answers neatly and in good English.

Work steadily through the paper.

Do not spend too long on one question.

Show all stages in any calculations.

Materials required for the paper

Ruler graduated in centimetres and millimetres, pen, HB pencil, eraser. Tracing paper may be used.

Calculators are NOT allowed

Leave blank

1. (a) Here are six numbers:

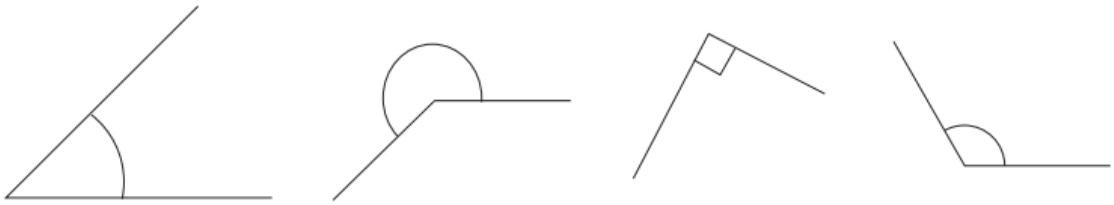
$$75\% \quad \frac{8}{10} \quad \frac{9}{12} \quad 0.75 \quad 66\frac{2}{3}\% \quad \frac{6}{8}$$

Two of the numbers are not equal to $\frac{3}{4}$

Draw a circle around each of the two numbers.

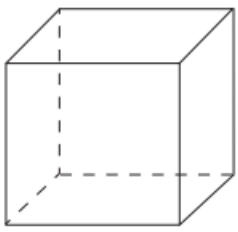
(2)

(b) Which angle below is obtuse? Circle your answer.



(1)

(c) How many vertices has a cube? Circle your answer.



8 6 12 4

(1)

Leave blank

2. (a) Write down the missing terms in the following sequence:

…….. , 81, 27, 9, ……, 1

(2)

(b) Work out the *n*th term of the following sequence:

45 36 27 18

*n*th term = ...

(2)

---

3. Evaluate the expression below for the values given:

$$6(a-2b)-c^2$$

(a) $a=3,\ b=4$ and $c=5$

.....

(3)

(b) $a=-2,\ b=-3$ and $c=-7$

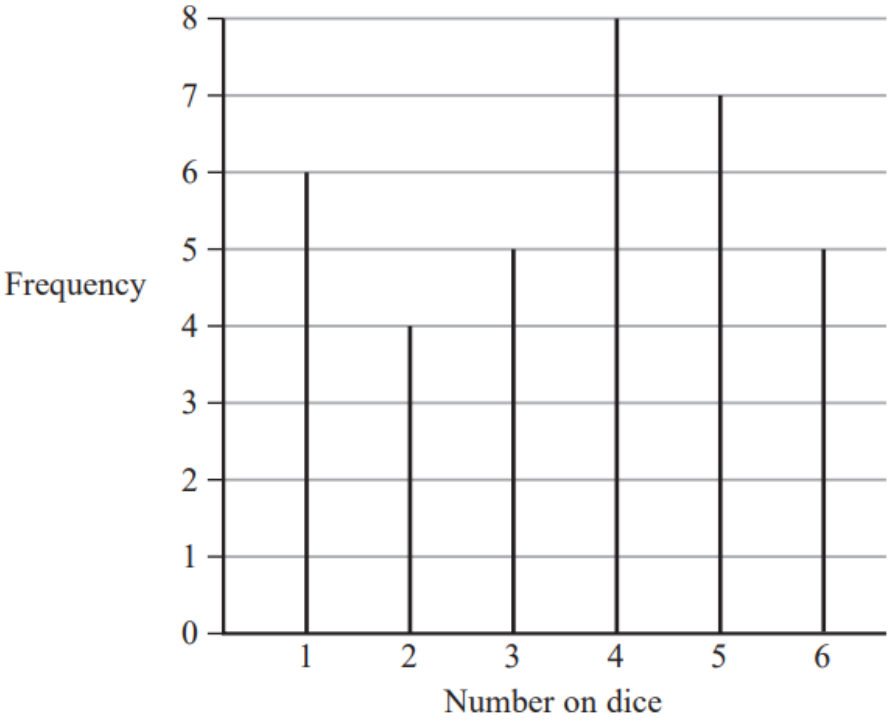
.....

(3)

Leave blank

4. Five students roll a dice.
They each roll the dice the same number of times.

The diagram gives information about the number of times the dice lands on each number.



Work out how many times each student rolled the dice.

..... times
(3)

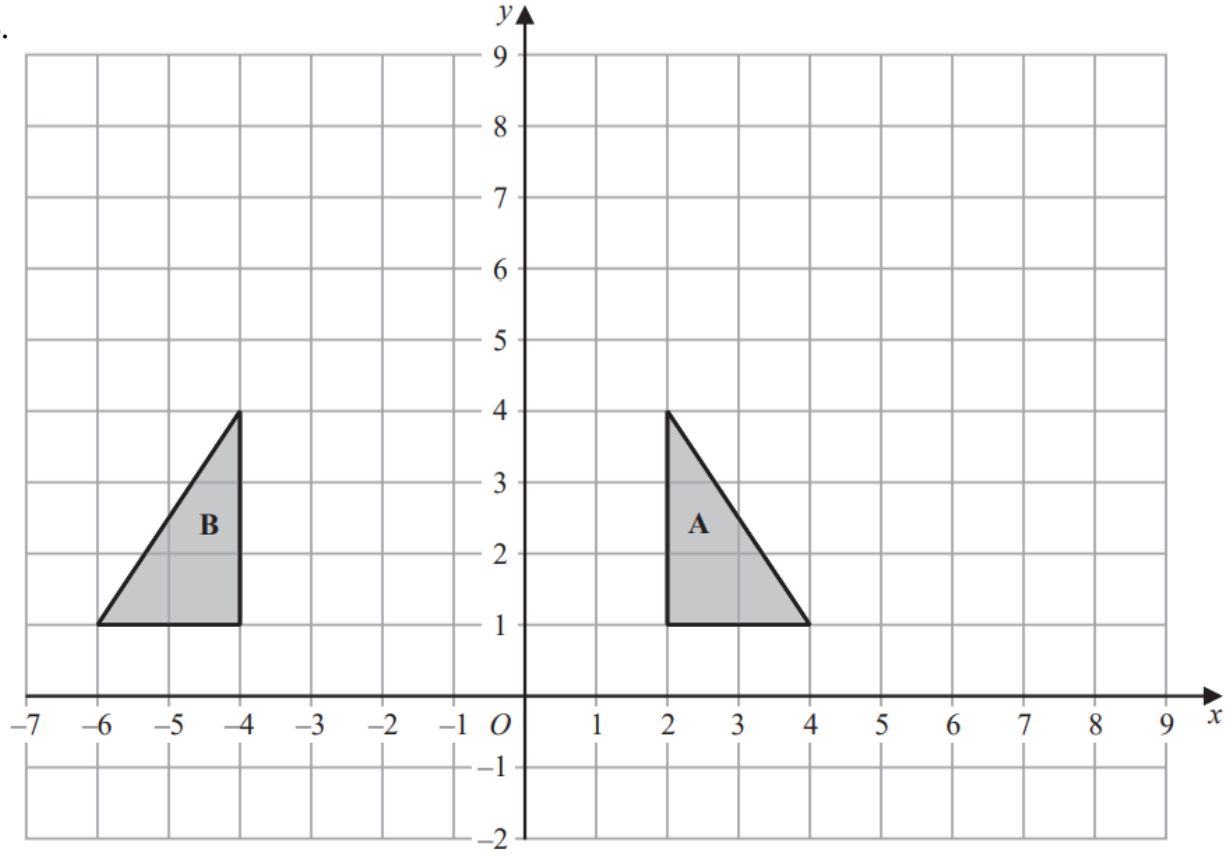
5. Complete the following table to the given degree of accuracy:

	1 decimal place	**2 decimal places**	**1 significant figure**
0.968			
189.673			

(3)

Leave blank

6.



(a) Describe fully the single transformation that maps triangle **A** onto triangle **B**

……

……

(2)

(b) On the grid above, enlarge triangle **A** with scale factor 2 and centre *O*
Label your triangle **C**

(2)

(c) Rotate triangle **A** 90° anticlockwise about (2, -1). Label this shape **D**.

(2)

---

7. Work out $\frac{3}{5} - 2\frac{2}{5} \div 4$. You must show all steps in your workings.

.....

(3)

Leave blank

8. (a) Simplify $4m - 2n + 3m + 5n$

.....

(2)

(b) Solve

(i) $\frac{t}{8} = 4$

$t =$ .....

(1)

(ii) $10n - 2 = 3$

$n =$ .....

(2)

---

9. (a) Change $\frac{5}{8}$ to a percentage.

..... %

(2)

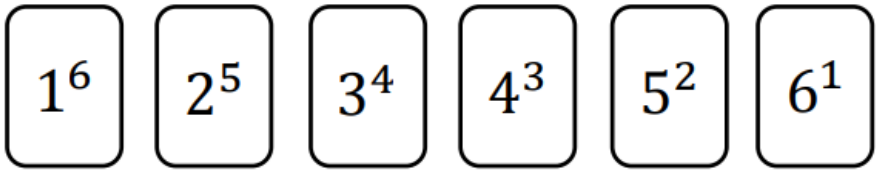
(b) A packet of grass seed costs £4.80.
Calculate the new price after a price reduction of 5%.

£ .....

(2)

Leave blank

10. (a) Look at these numbers:



Write down the largest?

.....

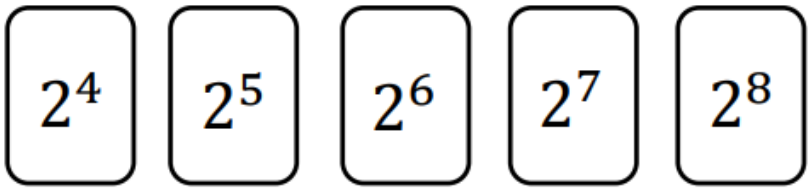
(1)

Write down the number which is equal to 8^2 ?

.....

(1)

(b) Circle the two numbers below that are not square numbers.



(2)

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11. Two numbers have these properties.

- Both numbers are greater than 6.
- Their highest common factor (HCF) is 6.
- Their lowest common multiple (LCM) is 60.

Find the two numbers.

....

(3)

Leave blank

12. (a) Simplify $2c^5 \div c^2$

.....

(1)

(b) Simplify $(3d^4)^3$

.....

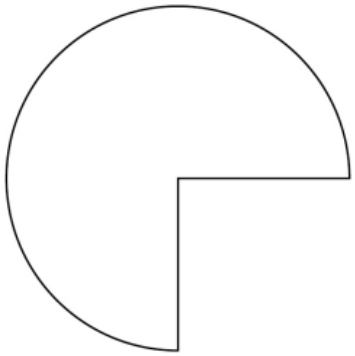
(2)

---

13. Here are two shapes, **P** and **Q**.

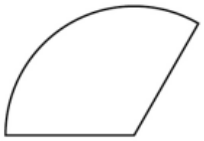
P

$\frac{3}{4}$ of a circle, radius 20 cm



Q

$\frac{1}{3}$ of a circle, radius 15 cm



Not drawn accurately

How many times bigger is the area of **P** than the area of **Q**? You must show your working. (You can work in terms of π)

The area of of **P** is ..... times bigger than the area of **Q**

(4)

Leave blank

14. In a Year 12 class, the following information was recorded

	Boys	Girls
Wears glasses	3	5
Does not wear glasses	10	6

(a) A pupil is chosen at random from the class.
What is the probability that the pupil is a boy who does not wear glasses?

.....

(2)

(b) A new boy joins the class, who wears glasses.
Will this change the probability of now choosing at random a girl who wears glasses?
Explain your answer clearly.

Answer: _____

because _____

(2)

---

15. In November, Andre received a monthly salary of 2500 euros.
Of this he spent

40% on his rent
300 euros on leisure

The rest of Andre's monthly salary was spent on household bills and on food where

the amount spent on household bills : the amount spent on food = 3 : 7

Work out how much of his November monthly salary Andre spent on food.

..... euros

(4)

Leave blank

16. Solve

(a) $6n-5=4n+3$

$n =$ .....

(2)

(b) $3(3-5d)=45$

$d =$ .....

(3)

(c) $5x^2=125$

$x =$ .....

(2)

---

17. (a) Change 530 grams into kilograms.

..... kilograms

(1)

Lauren has 3 litres of fruit juice. She is going to use the fruit juice to make some drinks for a party. Each cup of drink will contain 225 millilitres of fruit juice.

Lauren is going to make as many cups of drink as possible.

(b) Work out how much fruit juice Lauren has left when she has made as many cups of drink as possible. Give your answer in millilitres.

..... millilitres

(4)

Leave blank

18. A cinema ticket for an adult costs £t

A cinema ticket for a child costs £3

James bought four adult tickets and seven child tickets.

The total cost was £49

(a) Write down an expression for the cost of the four adult tickets.

.....

(1)

(b) (i) Form an equation that can be solved to find the cost of an adult ticket.

.....

(1)

(ii) Solve your equation to find the cost of an adult ticket.

£ .....

(2)

Leave blank

19. (a) *PO*, *RO*, *SO* and *TO* are four straight lines.

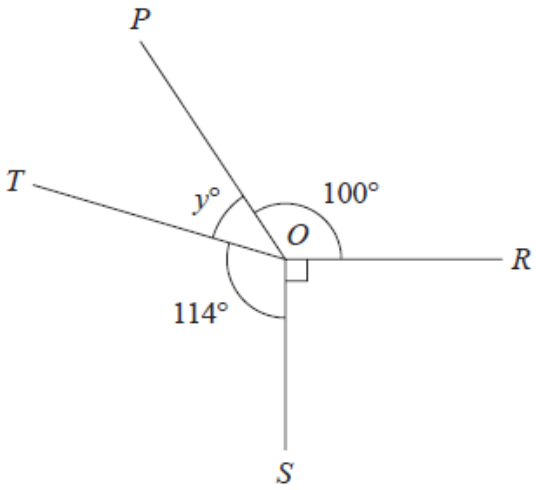


Diagram **NOT** accurately drawn

(i) Work out the value of *y*

y = ...

(2)

(ii) Give a reason for your answer.

.....

(1)

(b) Triangle **PQR** is isosceles with **PQ** = **QR**.

(i) Calculate the size of angle *x*

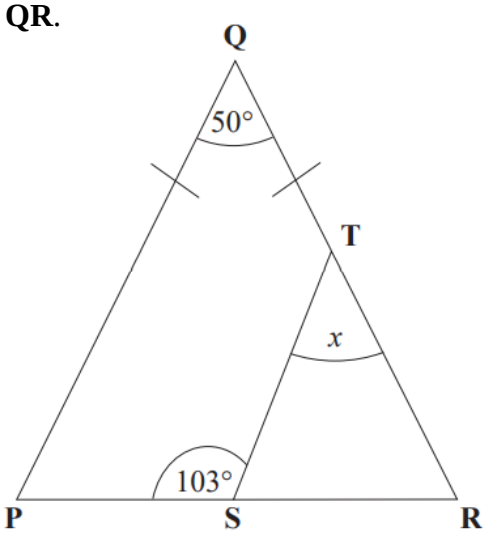


diagram not drawn accurately

x = ...

(4)

(ii) Hence decide if the lines **PQ** and **ST** are parallel.

_____ because _____

_____

(2)

Leave blank

20. The diagram shows a shape *ABCDEFG* made from a square *ABDF* and three identical isosceles triangles *BCD*, *DEF* and *FGA*.

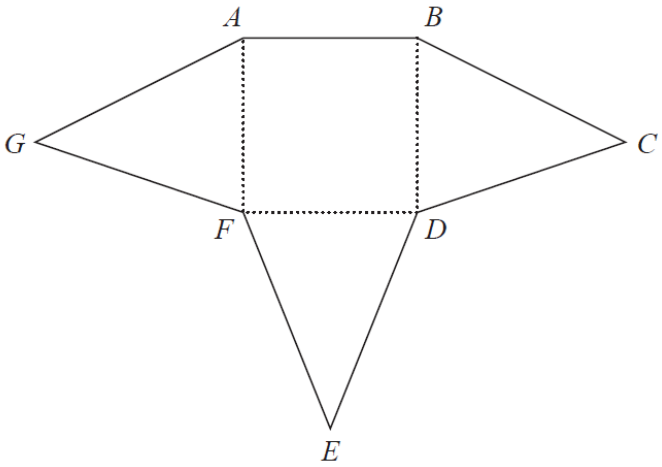


Diagram **NOT** accurately drawn

The perimeter of the square *ABDF* is 48 cm.
The perimeter of each isosceles triangle is 30 cm.
Work out the perimeter of the shape *ABCDEFG*.

..... cm
(3)

---

21. Use brackets to make the statement correct.
You may use more than one pair of brackets in the statement.

$$2^2 + 5 \times 2 + 3^2 = 99$$

(2)

Leave blank

22. *ABC* is a triangle.
AB = 8 cm, *AC* = 6 cm and *BC* = 9 cm.

Use a ruler and compasses to construct the triangle *ABC*.

You must show all your construction lines.

(2)

Leave blank

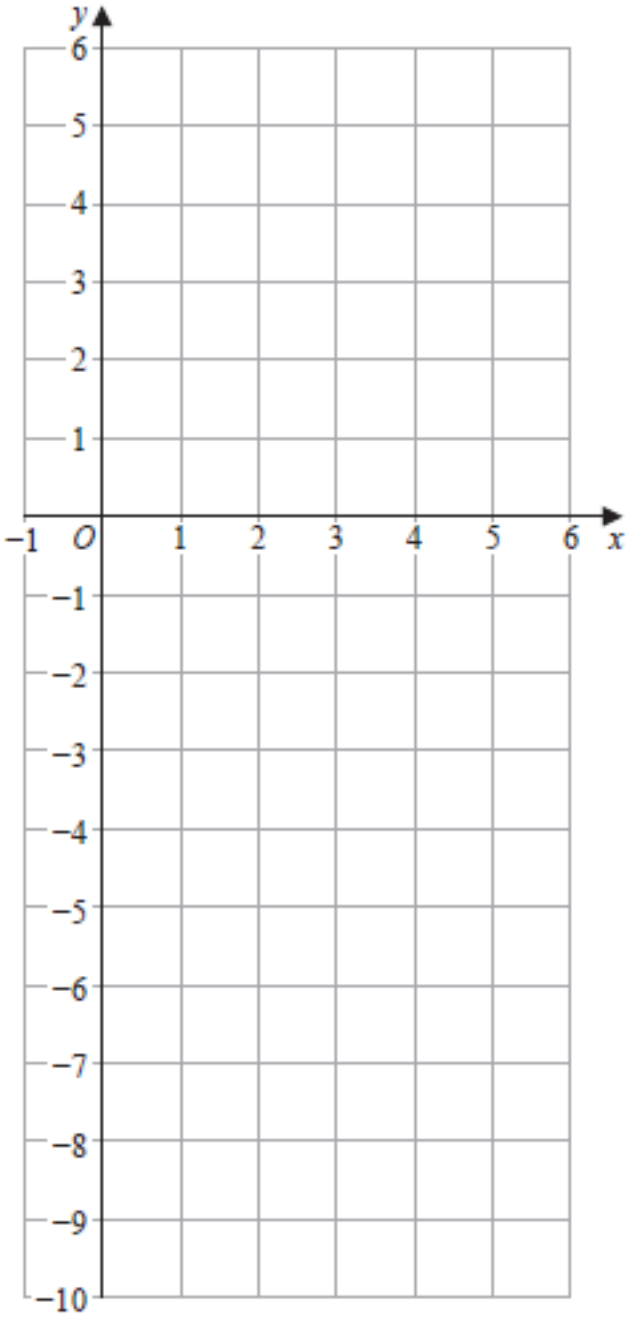
23. (a) Complete the table of values for $y = -2x + 3$

x	0	3	5
y			

(2)

(b) On the grid below, draw the line $y = -2x + 3$

(1)



(c) The line $x = 2$ crosses the line $y = -2x + 3$ at point **L**.
By drawing the line $x = 2$, find the coordinates of **L**.

L (…….. , ……..)

(2)

Leave blank

24. A regular dice is rolled, and a five-sided spinner with the numbers 1, 2, 3, 5, 7 is spun. The **difference** of their scores is recorded.

(a) Complete the sample space diagram for the possible combinations.

(2)

Regular dice

Spinner	**1**	**2**	**3**	**4**	**5**	**6**
1						
2						
3					2	
5						
7	6					

Calculate the probability of obtaining

(b) 4

……
(1)

(c) an odd number

……
(1)

(d) at least 3

……
(1)

(e) at most 4

……
(1)

Leave blank

25. Jake bought a chicken.
He is going to use this rule to work out the number of minutes it will take to cook his chicken.

Cooking time (minutes)

Multiply the chicken's weight, in kg, by 40
Then add
30

The weight of Jake's chicken is 2.6 kg
(a) Use this rule to work out the number of minutes it will take to cook Jake's chicken.

..... minutes
(2)

The following week Jake buys another chicken.
He uses the rule and works out that it will take 2 hours 40 minutes to cook this chicken.
(b) Work out the weight of this chicken.

..... kg
(3)

Leave blank

26. The ages, in years, of a family are shown.

Dave 47 Ellie 21 Fergus 18 Geri 44 Harry 10 Ivy 25 Kathy 12

(a) What is the range of their ages?

.....

(2)

(b) What is the median age of the family?

.....

(2)

(c) What is their mean age?

.....

(3)

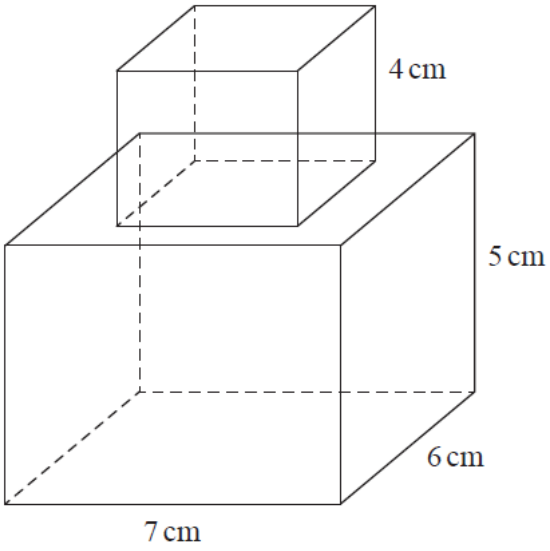
(d) What was the mean age of the family two years ago?

.....

(1)

Leave blank

27. A cube is placed on top of a cuboid, as shown in the diagram, to form a solid.



The cube has edges of length 4 cm.
The cuboid has dimensions 7 cm by 6 cm by 5 cm.

Work out the total surface area of the solid.

..... cm^2

(4)

TOTAL FOR PAPER IS 120 MARKS

END OF PAPER