The Haberdashers' Aske's Boys' School
Elstree



11+ Entrance Examination 2013

MATHEMATICS

One Hour

Full Name.....

Examination Number .....

INSTRUCTIONS

1. DO NOT OPEN THIS PAPER UNTIL YOU ARE TOLD TO DO SO.

2. There are 30 questions on this paper. DO NOT FORGET TO TURN OVER.

3. Work quickly but accurately. You are recommended to use pencil, but you can use pen or biro if you wish.

WRITE YOUR ANSWERS TO THE QUESTIONS IN THE SPACES PROVIDED.
YOU MAY USE THE SPACE AT THE BOTTOM OF EACH PAGE FOR WORKING. Answer

1. Add: $36+58$ _____

2. Subtract: $75-54$ _____

3. Multiply: 67×8 _____

4. Divide: $264\div 11$ _____

5. If a dozen eggs cost £2.80, how much do 18 eggs cost? _____

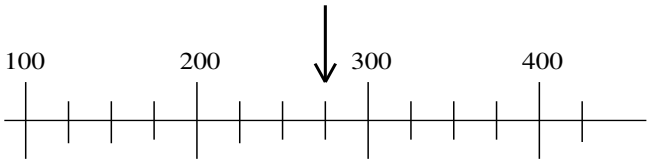
6. Find the difference between $43\frac{1}{3}$ and $51\frac{2}{3}$. _____

7. A box holds 4 cakes. How many boxes are needed to store 75 cakes? _____

8. Put a circle round the volume in the list below which gives the best estimate of the capacity of a tea cup:

   0.25 litres 0.5 litres 0.75 litres 1 litre 1.25 litres

9. Write down the number that the arrow is pointing to on the scale below:



_____

10. Put a circle round the biggest number and a square round the smallest number in this list:

   83% $\frac{4}{5}$ $\frac{1}{3}$ 0.333 0.825 30% 0.59 0.29 $\frac{29}{90}$

SPACE FOR WORKING

Answer

11. Put a circle round the number which **cannot** be expressed as the sum or difference of two other numbers in the list.

2 5 7 10 12 15 16 19

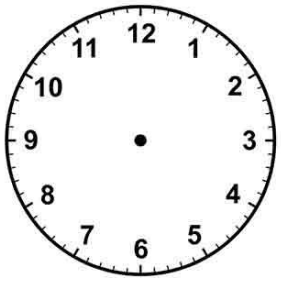
12. Fiona buys:

- 3 cans of coke @ 85p per can
- 5 samosas @ 30p per samosa

If Fiona pays with a £5 note, how much change does she get?

_____

13. Draw the hour and minute hands on this clock to show the time 22:30.



14. Add together the following numbers giving your answer in figures:

3 million
seventy thousand
thirty-two thousand
nineteen

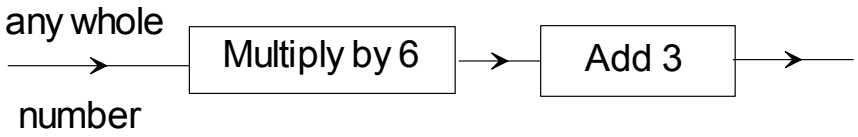
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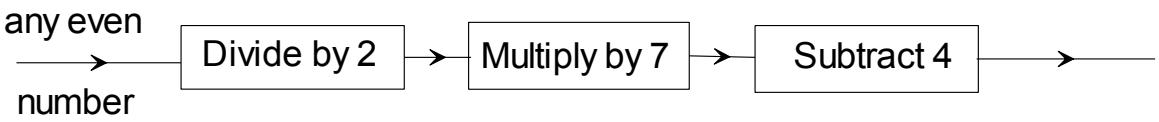
Answer

15. For each of the number machines below write down the letter:

A if the answer is always even
B if the answer is always odd
C if the answer is sometimes odd and sometimes even



_____



_____

16. An orange costs twice as much as an apple. Which one of the following does not cost the same as the other four?

A Two oranges and three apples
B Seven apples
C One orange and five apples
D Three oranges and one apple
E Four oranges

_____

SPACE FOR WORKING

Answer

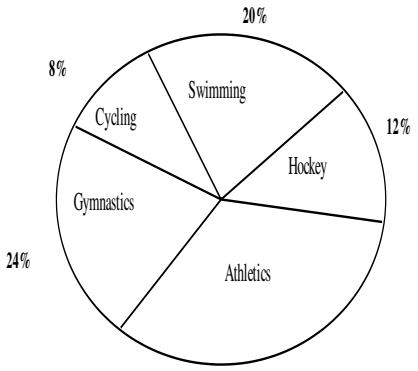
17. Jonathan thinks of a **whole number**, rounds it to the nearest 100 and gets an answer of 700.

What is the smallest number that Jonathan might have thought of? _____

What is the largest number that Jonathan might have thought of? _____

18. A group of people chose their preferred Olympic sport from a list of five: Athletics, Swimming, Cycling, Hockey and Gymnastics.

The proportions choosing each sport are shown on the pie chart:



What percentage of people chose Athletics? _____
If 45 people chose Athletics, how many chose Hockey? _____

19. In the square below, every row, column and diagonal adds up to 15. What number must be put into the square labelled A*?*

		6
9	5	
	A	

_____

SPACE FOR WORKING

Answer

20. We say that there is an even chance of getting a head when a coin is thrown. Which one of the following statements is definitely true?

A: There is an even chance that England will win the next football World Cup.
B: There is an even chance that I get one head and one tail when I toss a coin twice.
C: There is a greater than even chance that I get a 5 when I roll a single dice.
D: There is a less than even chance of picking a blue ball from a bag containing 3 blue and 2 red balls.
E: There is a less than even chance that a baby will be born somewhere in the world in the next minute.

_____

21. It takes a team of four people six hours to paint my fence.

How long would a team of eight people have taken? _____

One of my neighbours has a similar fence which is twice as long as mine.
She would like the work to be completed in less than five hours.
What is the minimum number of people that she should employ? _____

22. Work out the following giving your answers in fractions.

$\frac{1}{2}+\frac{1}{4}=$ _____

$\frac{1}{2}+\frac{1}{4}+\frac{1}{8}=$ _____

$\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\frac{1}{16}=$ _____

$\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\frac{1}{16}+\frac{1}{32}+\frac{1}{64}+\frac{1}{128}+\frac{1}{256}+\frac{1}{512}+\frac{1}{1024}=$ _____

If this pattern is continued the sums get ever closer to a particular number.
Write down this number.

_____

SPACE FOR WORKING

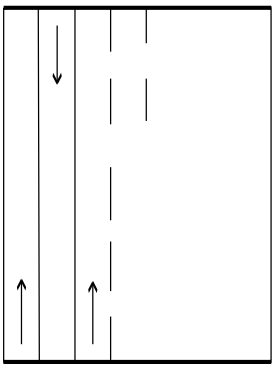
Answer

23. The average of a set of numbers is worked out by adding the numbers together and then dividing by the number of numbers.

The average number of runs scored by a cricket team in an innings is 17.
What was the total number of runs scored by all eleven players? _____

In this innings the opening pair of batsmen scored an average of 39.5 runs.
What was the average score of the remaining nine members of the team? _____

24. The diagram (not to scale) shows my back lawn which is 30 metres long and 20 metres wide. My lawnmower can cut strips 50 cm wide and I always mow the lawn by walking up and down in straight lines as shown.



How many strips do I need in total? _____

How far do I walk when I mow my lawn? Give the answer in metres. _____

I can push my lawnmower at a constant speed of 30 metres per minute and it takes me an extra 15 seconds to turn the mower round at the end of every strip. The mower itself takes 15 seconds to turn on.
How long does it take me to mow my lawn?

_____

SPACE FOR WORKING

Answer

25. The diagram shows a circle with a diameter, AB. The point A has coordinates (7, 4).

Write down the coordinates of the point B. _____

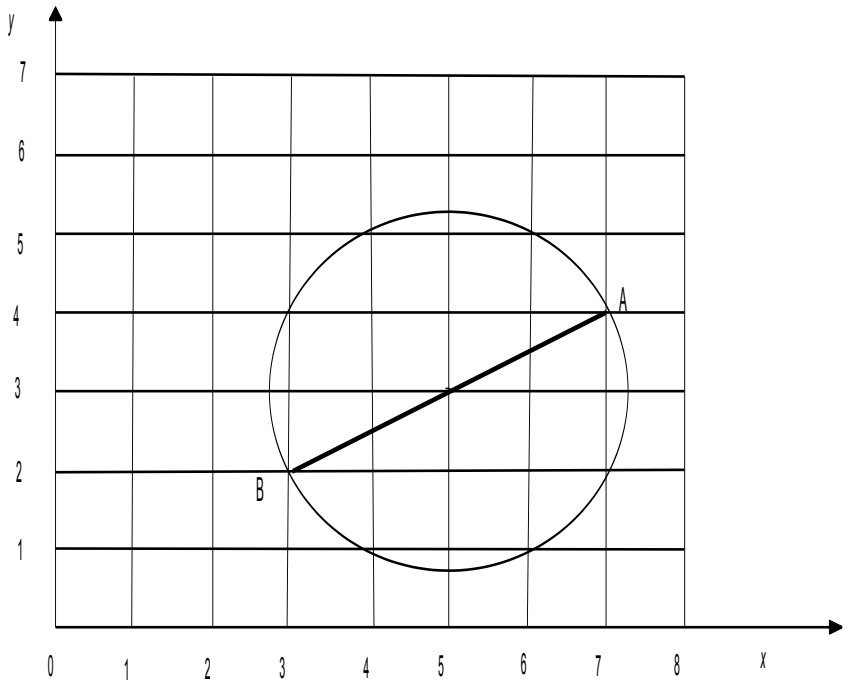
Write down the coordinates of the centre of the circle. _____

A second circle (not shown) has a diameter with end points A(6, 15) and B(12, 3).

Write down the coordinates of the centre of this circle. _____

A third circle (not shown) has centre (19, 27). If one end of a diameter has coordinates (17, 32), write down the coordinates of the point at the other end of the diameter.

_____



SPACE FOR WORKING

Answer

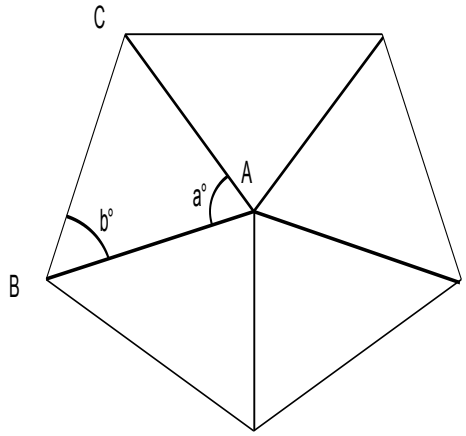
26. The diagram shows five and six sided polygons in which all sides have the same length.

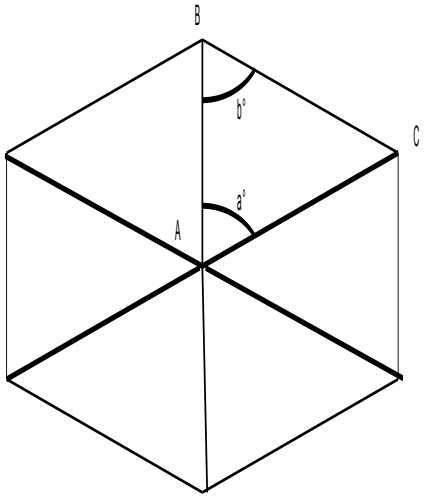
Complete the table below.

The following facts may be useful:

- the angle in one complete turn is 360°
- the angles in a triangle add up to 180°

	Five Sided Polygon	Six Sided Polygon
Name of shape		
Size of angle a		
Size of angle b		
Name of triangle ABC		





SPACE FOR WORKING

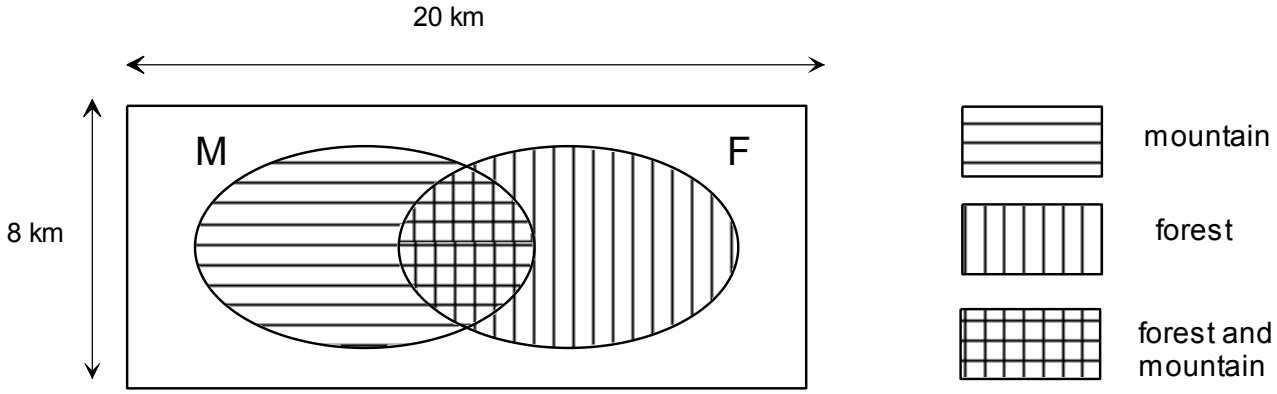
Answer

27. The notation 4! is used as an abbreviation for the product $4\times3\times2\times1$ so that 4! = 24. Similarly, 9! = $9\times8\times7\times6\times5\times4\times3\times2\times1=362880$.

Work out the value of

3! ____ 10! _____ $\frac{100!}{98!}$ _____

28. The land of Whasham consists of a rectangular lake with an island in the centre. The island has three types of terrain as shown in the diagram below which is not to scale.



Work out the area of Whasham. _____

The area of land which consists of forest but no mountain is 32 km^2 and the area which is both forest and mountain is 6 km^2. The area of water is 67 km^2 .

Work out the area of land which consists of mountain but no forest. _____

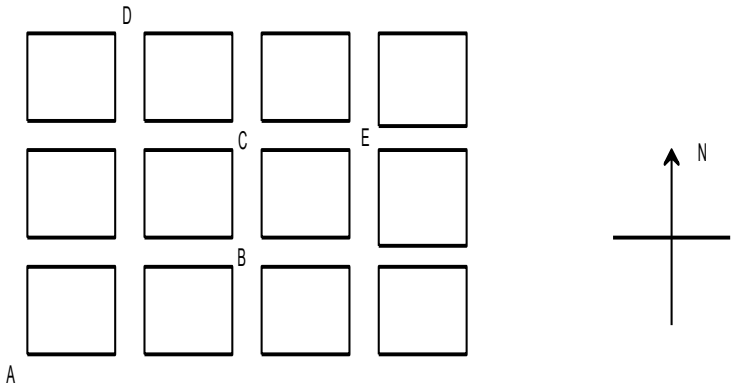
A total of 121 people live on the island. If 81 people live on land which is mountainous and 48 people live on land which is forested, how many live in the region which is both mountainous and forested?

_____

SPACE FOR WORKING

Answer

29. The streets of New York are arranged in a grid as shown in the diagram.



There are three direct ways of travelling from A to B.

- Travel one block North followed by two blocks East
- Travel one block East followed by one block North followed by one block East
- Travel two blocks East followed by one block North.

We write these as NEE, ENE and EEN respectively.

There are six direct routes from A to C. Four of these routes are NNEE, NENE, ENEN and EENN. Write down the remaining two routes.

_____ and _____

How many direct routes are there to travel from A to D? _____

How many direct routes are there to travel from A to E? _____

SPACE FOR WORKING



TURN OVER. THE LAST QUESTION IS ON THE BACK PAGE.

Answer

30. Ten runners, numbered 5 to 14 inclusive, take part in a race. There were no tied positions.

Winston watched the race but forgot to write down the positions of the runners. Fortunately Winston is a mathematician and he remembered one fact about the number of each competitor. List all possible numbers of the competitors in the spaces below. Hence complete the table showing the final positions in the race.

1st Prime number _____

2nd Factor of 24 _____

3rd Cube number _____

4th Multiple of 5 _____

5th Factor of 187 _____

6th Two-digit even number in which the first digit is smaller than the second _____

7th Two-digit number in which both digits are square numbers _____

8th Number which has exactly four factors _____

9th A square number _____

10th A number which is greater than 10 _____

Position in race	1	2	3	4	5	6	7	8	9	10
Number of runner										

SPACE FOR WORKING



Now go back and check all of your answers carefully