



# ALDENHAM SCHOOL

## 13 + Entrance Paper

### Sample 2011

#### Mathematics

Length of Examination – one hour

**Do not open until you are told to do so**

Surname: ..... School:.....

First name: ..... Age: Years ..... Months .....

#### INSTRUCTIONS FOR CANDIDATES

- Write your answers in the spaces provided in this booklet
- Show sufficient method to show how you obtained your answers
- Calculators **MUST NOT** be used in any question.
- Drawing instruments may be used.

Work steadily through the paper doing as much as you can straight away. Then go back to work at the more difficult questions. Make sure you have attempted to answer all the questions. There are 33 questions on this paper.

1. Work out  $8.4 + 1.78$

.....[2]

2. Work out  $19.63 - 2.47$

.....[2]

3. Work out  $42 \times 5.98$

.....[2]

4. Work out  $23.04 \div 4$

.....[2]

5. Write 0.32 as a percentage.

..... %[1]

6. Write  $\frac{23}{25}$

a. as a decimal.

.....[2]

b. as a percentage

.....[2]

[Total 4]

7. Calculate  $\frac{1}{3} + \frac{3}{4}$  and give your answer as a mixed fraction.

.....[3]

8. Calculate  $1\frac{2}{5} \times \frac{5}{6}$ , giving your answer in its simplest form.

..... [2]

9. a. Write 18 as a product of prime factors

18 = .....[2]

b. Write 24 as a product of prime factors

24 = .....[2]

c. Hence or otherwise find the Highest Common Factor of 18 and 24.

.....[2]

[Total 6]

10. Work out the following

(a)  $-6 - 3$  .....

(b)  $3 - (-8)$  .....

(c)  $-4 \times 12$  .....

(d)  $-48 \div -4$  .....

[4]

11. Estimate the value of  $\frac{563+158}{3.72-2.03}$

.....[2]

12. At the end of 2009 the population of Maths Town was 24 000. In 2010 the population increased by 15%. What was the population of Maths Town at the end of 2010?

.....[3]

13. Put the following fractions in order of size, smallest first:

$$\frac{2}{5}, \frac{1}{4}, \frac{3}{8}, \frac{4}{10}$$

.....[3]

14. Aldenham Hockey Club have won, drawn and lost their matches this season in the ratio 3:2:1. They have played 24 matches. How many games have they not won?

.....[3]

15. Evaluate  $5^2 - 2^2$

.....[2]

16. Simplify as far as possible:  $11x + 8 - 3y - 4x - 7 - y$

.....[3]

17. Simplify as far as possible:  $2g \times 4f \times 5t$

.....[2]

18. Expand the bracket  $5(3x - 1)$ .

.....[2]

19.  $S = \frac{n}{2}(2a + (n - 1)d)$

Find the value of  $S$  when  $n = 12$ ,  $a = 1$  and  $d = 2$ .

$S = \dots\dots\dots[3]$

20. Solve the equation  $30 - y = 4$ .

$y = \dots\dots\dots[1]$

21. Solve the equation  $2x + 3 = 19$

$x = \dots\dots\dots[2]$

22. Solve the equation  $2x - 3 = 21$

$x = \dots\dots\dots[2]$

23. Solve the equation  $2x + 4 = 10 - 2x$ .

$x = \dots\dots\dots[2]$

24. Write down the next two terms of the sequence 4, 5, 7, 10, 14,

.....[2]

25.

Lisa packs pencils in boxes.  
She packs 12 pencils in a box.  
Lisa packs  $x$  boxes of pencils.



a. Write an expression, in terms of  $x$ , for the number of pencils Lisa packs.

.....[1]

Lisa also packs pens in boxes.  
She packs 10 pens in a box  
Lisa packs  $y$  boxes of pencils.

b. Write down an expression, in terms of  $x$  and  $y$ , for the **total** number of pencils and pens that Lisa packs.

.....[2]

[Total 3]

26. The table shows some rows of a number pattern

|       |               |   |                        |
|-------|---------------|---|------------------------|
| Row 1 | 1             | = | $\frac{1 \times 2}{2}$ |
| Row 2 | 1 + 2         | = | $\frac{2 \times 3}{2}$ |
| Row 3 | 1 + 2 + 3     | = | $\frac{3 \times 4}{2}$ |
| Row 4 | 1 + 2 + 3 + 4 |   |                        |
|       |               |   |                        |
|       |               |   |                        |
|       |               |   |                        |
| Row 8 |               |   |                        |

a. In the table, complete Row 4 of the number pattern.

[1]

b. In the table, complete Row 8 of the number pattern

[1]

c. Work out the sum of the first 100 whole numbers.

.....[2]

[Total 4]

27.

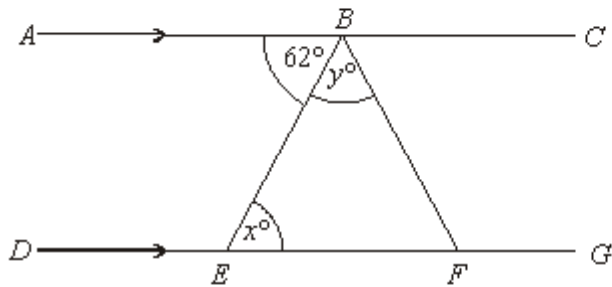


Diagram **NOT** accurately drawn

ABC and DEFG are straight lines  
AC is parallel to DG  
BE = BF  
Angle ABE =  $62^\circ$

a. (i) Find the value of  $x$

$x = \dots\dots\dots^\circ$

(ii) Give a reason for your answer.

.....

[2]

b. Work out the value of  $y$ .

$y = \dots\dots\dots^\circ$

[2]

[Total 4]

28. Here is the net of a cube.

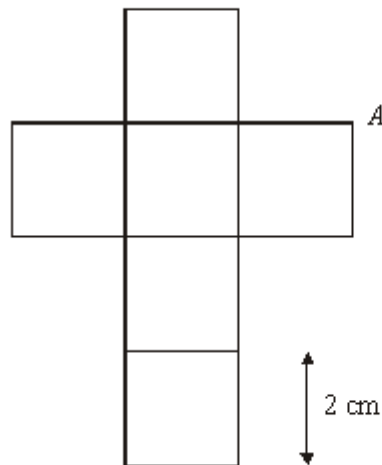


Diagram **NOT** accurately drawn

The net is folded to make the cube.  
Two other vertices meet at A.

a. Mark each of them with the letter A.

[2]

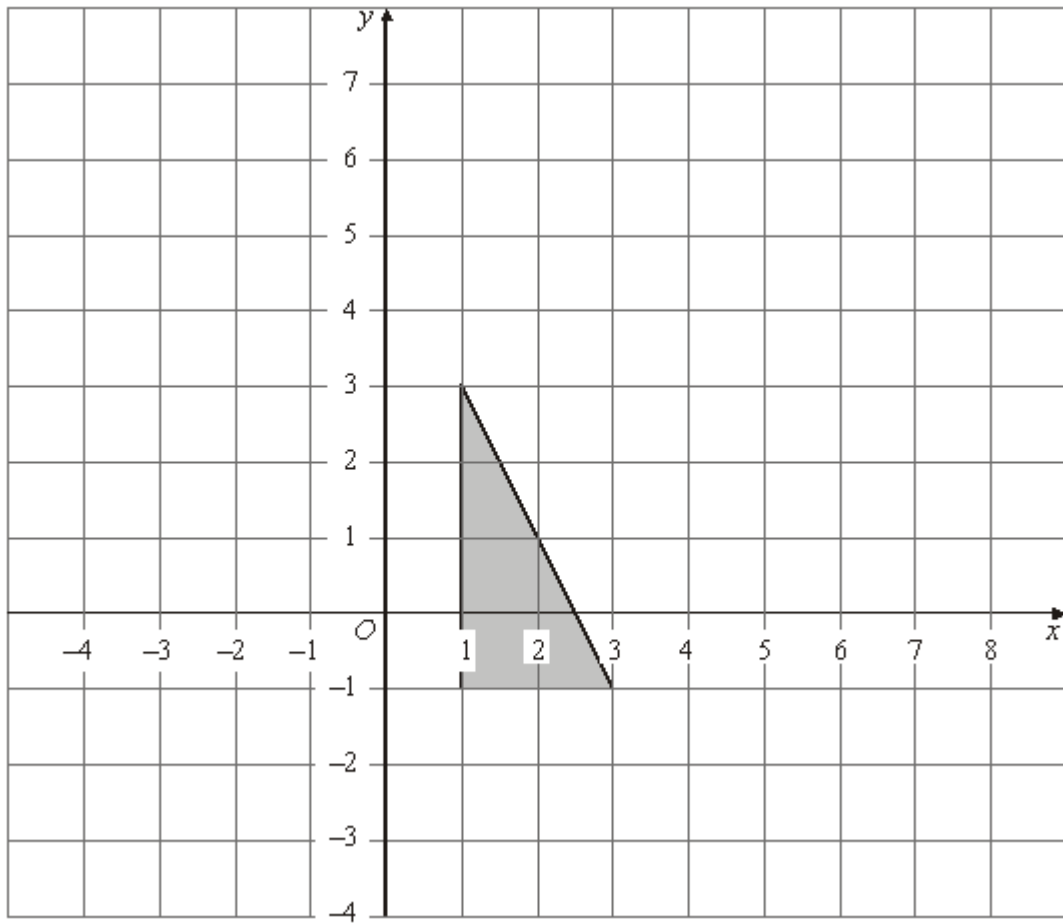
The length of each edge of the cube is 2cm.

b. Work out the volume of the cube.

.....[2]

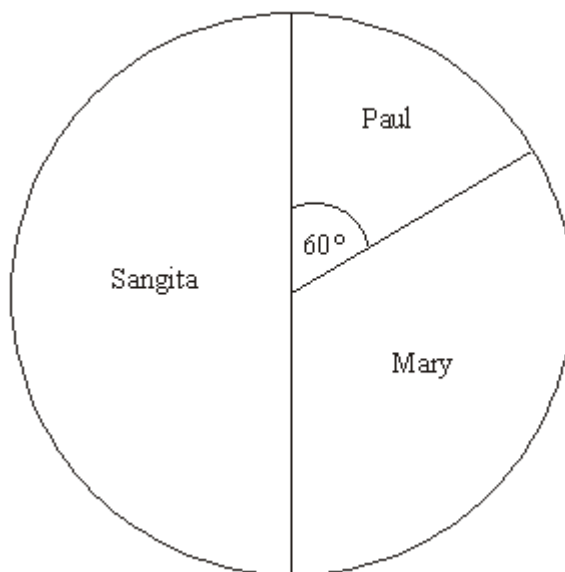
[Total 4]

29. Enlarge the shaded triangle by a scale factor of 2, centre O.



[3]

30. The pie chart gives information on the votes received by Paul, Mary and Sangita in an election.



- a. Who got the least votes?

.....[1]

The total number of votes in the election was 36.

- b. How many votes did Sangita get?

.....[1]

- c. The angle in the pie chart for Paul is  $60^\circ$ .  
What fraction of the votes did Paul get?  
Write the fraction in its simplest form.

.....[2]

[Total 4]

31. In the space below construct an equilateral triangle of sides 6cm using a pair of compasses and a ruler only [show all construction lines]

32. The six employees of Happy and Co. are paid the following salaries: £24 000, £24 000, £24 000, £24 000, £50 000 and £82 000.

Work out the mean, mode and median salary for Happy and Co.:

Mode = .....[1]

Median = .....[2]

Mean = .....[3]

Which average best represents the salaries of Happy and Co.? Give a reason for your answer.

[2]

[Total 8]

33. Here is part of a railway timetable

|                |       |       |       |       |       |       |
|----------------|-------|-------|-------|-------|-------|-------|
| Manchester     | 05 15 | 06 06 | 06 45 | 07 05 | 07 15 | 07 45 |
| Stockport      | 05 26 | 06 16 | 06 55 | 07 15 | 07 25 | 07 55 |
| Macclesfield   | 05 39 | 06 29 | 07 08 |       | 07 38 | 08 08 |
| Stoke-on-Trent | 05 54 | 06 45 | 07 24 |       | 07 54 | 08 24 |
| Stafford       | 06 12 |       | 07 41 |       | 08 11 |       |
| London Euston  | 08 07 | 08 26 | 09 06 | 09 11 | 09 50 | 10 08 |

A train leaves Manchester at 06 45.

a. (i) At what time should this train arrive at London Euston?

.....[1]

(ii) How long should it take to travel from Manchester to Stoke-on-Trent?

.....[1]

Mark has to go to a meeting in Stafford.  
He will be catching the train in Stockport.  
He needs to arrive in Stafford before 08 00.

b. Write down the time of the latest train he can catch from Stockport.

.....[1]

c. Work out the time it would take the 07 05 train to travel from Manchester to London Euston. Give your answer in hours and minutes.

.....hours.....minutes [2]

The 06 45 train from Manchester takes more time to get to London Euston than the 07 05 train.

d. Work out how many more minutes the 06 45 train takes.

.....[2]

[Total 7]

**END**

Total [100]