

The Haberdashers' Aske's Boys' School
Elstree



11+ Entrance Examination 2015

MATHEMATICS
One Hour

Full Name.....

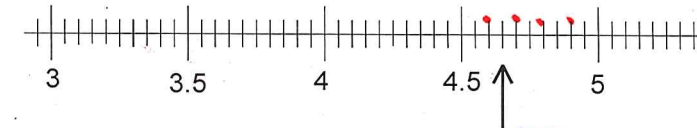
Examination Number

INSTRUCTIONS

- DO NOT OPEN THIS PAPER UNTIL YOU ARE TOLD TO DO SO.
- There are 30 questions on this paper. DO NOT FORGET TO TURN OVER.
- 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: $47+38$ | 85 |
| 2. Subtract: $81-49$ | 32 |
| 3. Multiply: 28×7 | 196 |
| 4. Divide: $78 \div 6$ | 13 |
| 5. A hospital nurse earns £23,080 a year. Work out the annual salary of a consultant who earns four times as much as a nurse. | £ 92320 |
| 6. What is a half of three-quarters? | $\frac{3}{8}$ |
| 7. A concert performance of Mahler's third symphony begins at 7:35pm and ends at 9:11pm. How many minutes does it last? | $25+71=96$ |
| 8. The number 5 is a factor of 65 because it divides into 65 without a remainder. Write down the other three factors of 65. | 1, 13, 65 |
| 9. For every three strawberry jellies in a bag of sweets there are four cherry jellies. If a large bag contains 12 strawberry jellies how many cherry jellies are there in the bag? | 16 |
| 10. How many millimetres are there in a kilometre? Give your answer in words. | $1000 \times 100 \times 10 = 1000,000$ |
| 11. Write down the number that the arrow is pointing to on the scale. | |



SPACE FOR WORKING

$65 = 1 \times 5 \times 13$

~~4.6~~ 4.65

Handwritten calculations for question 12:

$$\frac{143}{100} = 1.43$$

$$\frac{26}{25} = 1.04$$

$$\frac{150}{100} = 1.5$$

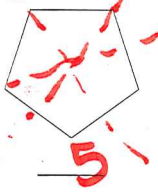
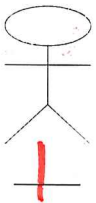
Ordering from smallest to largest: $1.04, 1.43, 1.5$

12. Put the following numbers in order starting with the smallest.

1.9, $\frac{26}{25}$, $1\frac{3}{7}$, 150%

Answer

13. How many lines of symmetry, if any, does each of these shapes have?



Handwritten note: $21 = 3 \times 7$
4th of May

14. Novak has a tennis lesson every 3 days starting on Monday 13th April. Write down the date of the next Monday when he has a lesson.

15. Find the area of a square with a perimeter of 36cm.

81 cm²
44 cm

Find the perimeter of a square with an area of 121cm².

16. How many times does 35 divide into 4207 and what is the remainder?

120 times with a remainder of 7

17. Andy walks 2.4 kilometres in 30 minutes. Work out his speed in both kilometres per hour and metres per minute.

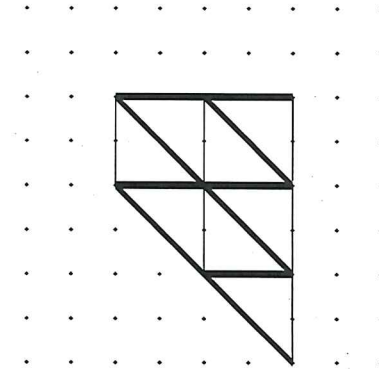
4.8 km/hr 80 m/min

SPACE FOR WORKING

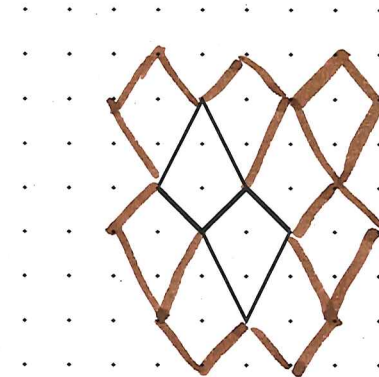
Handwritten calculation for question 17:

$$\frac{4806 \text{ m}}{60 \text{ min}}$$

18. A tessellation is a pattern of tiles that fit together perfectly with no gaps or overlaps. The diagram below shows a tessellation of eight triangles drawn on dotty paper.

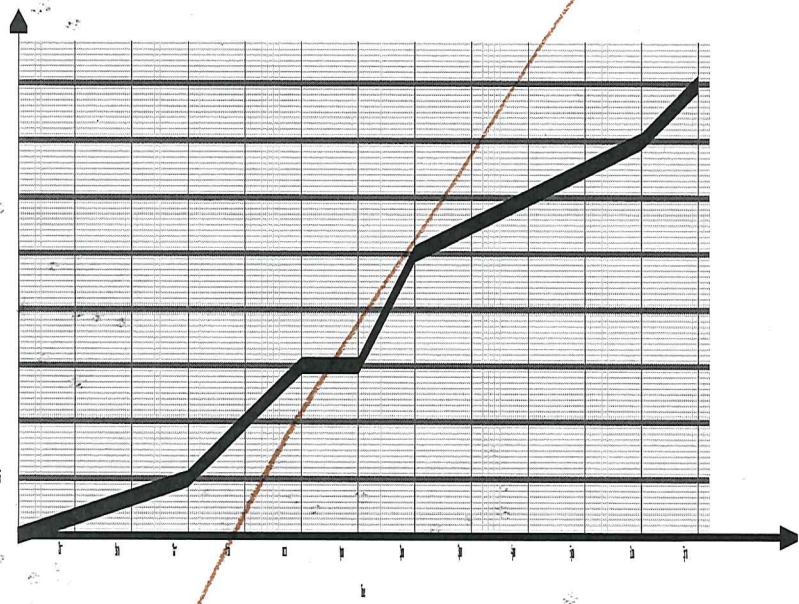


Draw six more kites on the dotty paper below to show how they tessellate.





19. The graph shows the total amount of rainfall accumulated during a particularly wet day in January 2014.



- How much rain had fallen by 10am? _____
- When did the accumulated rainfall reach 27.5mm? _____
- How much rain fell between 3pm and 6pm? _____
- During which period of the day did it stop raining? _____ to _____
- During which period of the day did the heaviest rainfall occur? _____ to _____

SPACE FOR WORKING

Answer

20. Stuart has a dodgy dice. He rolls it 30 times and records the results in a tally chart. Fill in the last column of the chart.

1	2	3	4	5	6
2	6	11	17	20	43

Write down the proportion of times that Stuart's dice lands on a six. Give your answer as a fraction cancelled down to its lowest terms.

$\frac{4}{13}$

What proportion of sixes would you expect to get if you roll a normal dice?

$\frac{1}{6}$

21. Five Whatsits and four Thingummyjigs cost £14.95.

Work out the cost of a Whatsit in each of the following cases:

When twelve Thingummyjigs cost £10.20.

$\pounds 2.31$

When a Thingummyjig costs twice as much as a Whatsit.

$\pounds 1.15$

SPACE FOR WORKING

$$4 \text{ Then } = 3.40$$

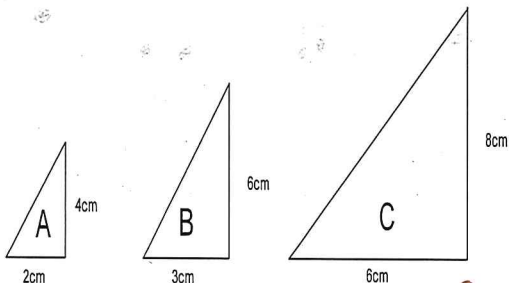
$$\frac{11.55}{5}$$

$$14.95 \div 13$$

Answer

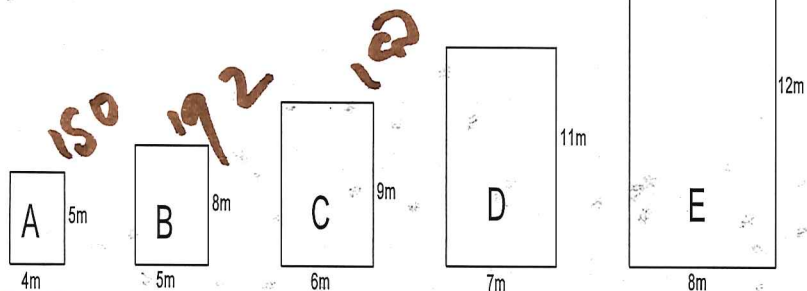
22. Two shapes are said to be **similar** if one is an exact enlargement of the other. For example, triangles A and B are similar because the width of B is 1.5 times the width of A, and the height of B is also 1.5 times the height of A.

On the other hand, triangles A and C are not similar because the width of C is three times that of A but the height of C is only twice that of A.



Which two rectangles in the list below are similar?

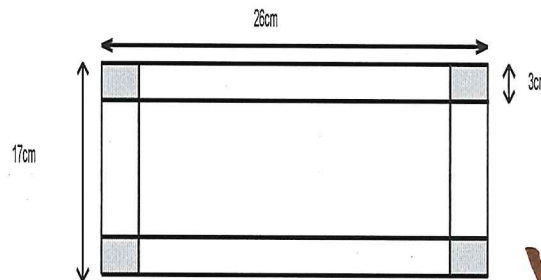
G and E



SPACE FOR WORKING

Answer

23. The corners of this rectangular sheet of cardboard are cut out and the sheet is then folded to make a box without a lid. Work out the volume of the box and state the units.



660 cm³

$11 \times 20 \times 3$
660

24. Complete the multiplication table.

×	<u>0.3</u>	0.4
0.1	<u>0.03</u>	<u>0.04</u>
<u>2</u>	6	0.8

8000 l

25. An aircraft takes off from London Heathrow with 120,000 litres of fuel on board. It flies at an average speed of 800 kilometres per hour and uses fuel at a rate of 10 litres per kilometre.

How much fuel is left in the tank when it lands in Miami 9 hours later?

48000 l

SPACE FOR WORKING

$120,000$
 72000

 48000



Answer

26. It is possible to buy and sell shares in a firm on the 1st January each year. The price of each share on this date over the past 11 years is shown in the table.

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
£3	£4	£4.50	£5	£6	£4	£1	£1.50	£1.50	£4	£5

In which year was the share price the lowest?

2011

Vivek buys 5,000 shares in 2005 and sells these shares in 2015. Work out the total profit made.

£10000

Peter buys 1,500 shares in 2009 and sells them in a later year. Given that he makes a loss of £3,000, find the two possible years in which he might have sold his shares.

2010 or 2014

Work out the years in which you could have bought shares and then sold them which would have made the greatest profit and greatest loss.

	Buy	Sell
Greatest profit	2005	2015
Greatest loss	2009	2011

SPACE FOR WORKING

Answer



27. In the January sale a furniture store reduces all prices by 25%.

Work out the sale price of a bed originally costing £1,600.

£1200

Work out the original price of a sofa costing £600 in the sale.

£800

At the end of the month a further reduction of 20% is taken off the sale prices of all items in the store.

40%

- Anne says that this is the same as an overall reduction of 45% off the original price.
- Ben says that this gives an overall reduction of less than 45%.
- Charlie says that this gives an overall reduction of more than 45%.
- Diana says that the overall percentage reduction varies depending on the original cost of each item.



Who is right?

Ben

28. A sequence of numbers which go up (or down) by a fixed amount each time is called an arithmetic progression (AP). For example, the sequence

1st term = 5.8, 2nd term = 6.0, 3rd term = 6.2, 4th term = 6.4

is an AP because the terms go up by 0.2 every time.

The 1st term of an AP is 0.3 and the 2nd term is 0.8. Work out the 3rd term.

1.3

The 1st term of an AP is 9 and the 3rd term is 15. Work out the 2nd term.

12

The 1st term of an AP is 4 and the 5th term is 16. Work out the 4th term.

13

The 1st term of an AP is 5.8 and the 2nd term is 5.9. Work out the 100th term.

15.7

SPACE FOR WORKING

Handwritten calculations for question 28:

$$\begin{array}{r} 5.8 + \\ 9.9 \\ \hline 15.7 \end{array}$$

$$\frac{25}{100} \times \frac{20}{100} = \frac{500}{10000}$$

$$200 - 150 \times 20 = 75 \times 80 = 6000$$

Answer

29. The Swiss transportation system is the best in the world. Not only does it run on time but it is possible to transfer seamlessly from one mode of transport to another.

The journey from Giessbach to Grutschalp has three stages: a steamer across Lake Brienzensee to Interlaken, a train from Interlaken to Lauterbrunnen and finally a cable car from Lauterbrunnen to Grutschalp.

- Steamer boats leave Giessbach every 70 minutes and the journey across the lake takes 60 minutes.
- Trains leave Interlaken every 40 minutes and the journey takes 30 minutes.
- Cable cars leave Lauterbrunnen every 15 minutes and the journey takes 10 minutes.

The first steamer, train and cable car of the day are all at 07:00.

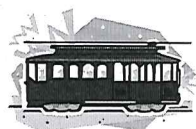
Geoff arrives at the dock at Giessbach at 08:00. Work out the earliest time that he can get to Grutschalp. Put the departure and arrival times of each stage of his journey in the table below.

	Giessbach	Interlaken	Lauterbrunnen	Grutschalp
Arrive	08:00	09:10	10:10	10:25
Depart	08:10	09:40	10:15	

Tom travels from Giessbach to Grutschalp arriving at Grutschalp at 15:10. Work out the latest time that he might have left Giessbach. Put the arrival and departure times of each stage of his journey in the table below.

	Giessbach	Interlaken	Lauterbrunnen	Grutschalp
Arrive		13:50	14:50	15:10
Depart	12:50	14:20	15:00	

SPACE FOR WORKING



Answer

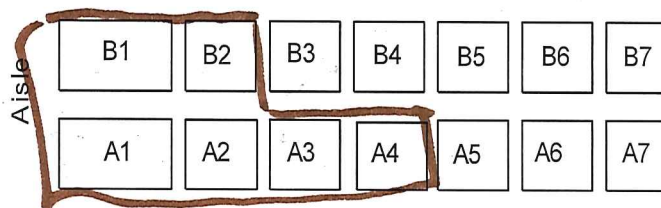
30. Mr Green buys four cinema tickets for himself, his wife and their best friends Mr and Mrs White. Mrs Green is a rather large lady who must sit in a wider aisle seat. In the interest of marital harmony each husband must sit next to his wife. The tickets are for seats A1, A2, A3 and A4 shown on the plan below.

In how many possible ways can Mr Green allocate tickets? 2

The following week they are joined by their next best friends, Mr and Mrs Brown. Again it is decided that every husband sits next to his wife, and Mrs Green must sit on the end of a row. The tickets are for seats A1, A2, A3, A4, A5 and A6.

In how many possible ways can Mr Green allocate tickets? 8

The outing was so enjoyable that all three couples decide to repeat the experience the following week but this time Mr Green buys tickets for seats A1, A2, A3, A4, B1 and B2. Assuming that the usual restrictions about where they can sit still apply, work out the number of ways in which Mr Green can allocate the tickets. 32



SPACE FOR WORKING

Handwritten notes for problem 30:

M1 M2 W B

9 5 W B

8 + 8 +

Now go back and check all of your answers carefully.

Handwritten time list on page 11:

07:10

07:40

08:20

09:00

09:40

10:20

11:00

13:00

13:40

14:20

Handwritten time list on page 11:

07:10

09:10

09:20

10:30

11:40

12:50

3:10