# The Haberdashers' Aske's Boys' School
# Elstree, Herts

11+ Entrance Examination 2009

## MATHEMATICS

## Time : One Hour

Full Name .....

Exam Number .....

### Please follow these 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: $34 + 87$ _____

2. Subtract: $82 - 33$ _____

3. Multiply: $17 \times 5$ _____

4. Divide: $324 \div 9$ _____

5. In a Maths test Freddie gets 37 more marks than George. If Freddie gets 61, what mark does George get? _____

6. How many days are there in 48 weeks? _____

7. Rob works 40 hours a week and earns £440. What is his hourly rate of pay? _____

8. Work out the sum of 43, 108, 57 and 92. _____

9. Write the number fifty-three thousand and eighteen in figures. _____

10. If 750 grams of pasta cost 90p find the cost of 1 kilogram. _____

11. Write down any fraction between $\frac{1}{3}$ and $\frac{1}{2}$. _____

12. A bus has 35 passengers on board. At the first stop two-fifths get off and then 7 people get on. At the next stop a quarter of the people remaining on the bus get off and then 13 get on. How many passengers are there on the bus now?



_____

SPACE FOR WORKING

Answer

13. I think of a number, double it, take the answer away from 41, and I am left with 3. What number did I think of? _____

14. Work out each of the following: $4.76 \times 10$ _____

$39.2 \div 100$ _____

15. Find the difference between 10% of £20 and 20% of £10. _____

16. A twelve inch ruler is approximately 30 cm long. Use this fact to estimate each of the following:

The number of centimetres in 4 inches. _____

The number of inches in 5 centimetres. _____

The number of centimetres in 9 feet 10 inches. _____

17. I turn 40 degrees clockwise, 70 degrees anticlockwise and finally 90 degrees clockwise. If I want to return to my original position by turning through the smallest possible angle, in which direction should I turn and what should the angle be?

Direction: _____ Angle: _____

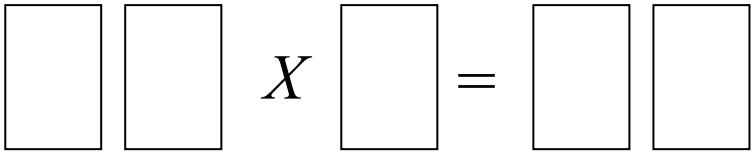
18. A large crate holds twelve cartons of milk whereas a small crate holds only four cartons. I have five large crates and twenty small crates available. What is the smallest number of crates in total that I could use to store 110 cartons of milk?

_____

SPACE FOR WORKING

Answer

19. Fill in the spaces in the boxes below with each of the digits 1, 3, 6, 7 and 8 to make a correct sum:



20. Write one of the words “always”, “sometimes” and “never” in the spaces below to make each of the statements correct:

The sum of two odd numbers is _____ even.

When an odd number is multiplied by an even number the answer is _____ odd.

The product of two even numbers is _____ a multiple of four.

When an even number is divided by an even number the answer is _____ odd.

21 Ravi has two sisters, Harsha and Harpreet. He likes to share out his sweets unfairly. One day he gives Harsha twice as many as he gives himself, and he gives Harpreet half as many as he gives himself. If there are 42 sweets in total how many does Ravi get?

_____

SPACE FOR WORKING

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Answer

22 Fill in the missing **words**:

There are _____ words in this sentence.

The total number of times in which the letter e has been written in this sentence is _____ .

23. In Sydney Australia the time is 11 hours ahead of the UK.

John decides to phone his Great Aunt Matilda at 2300 hours UK time on the 30th January. What is the time and date in Sydney when Matilda receives the call?

Time: _____ Date: _____

John's sister Penny goes one better and decides to visit Great Aunt Matilda. She leaves the UK at the same time that John makes his phone call. Given that the total journey time is 27 hours, what is the Sydney time and date when Penny arrives?

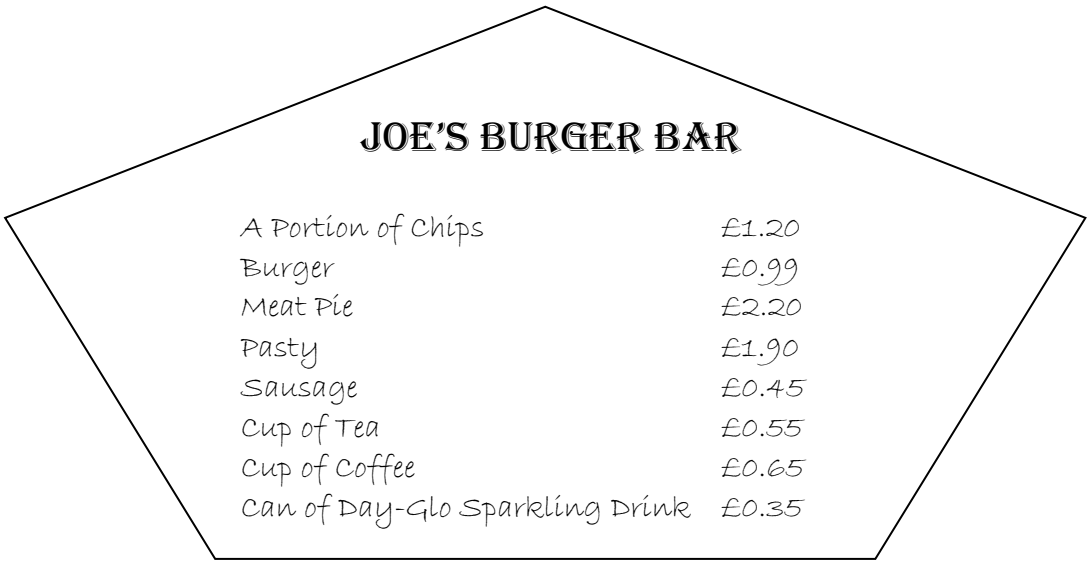
Time: _____ Date: _____

SPACE FOR WORKING



Answer

24. The list below shows the prices at greasy Joe's roadside snack bar. Four friends, Peter, Jon, Simon and Duncan decide to stop by for a meal on their way home from work one day.




Peter buys one burger, a portion of chips and a coffee. Work out the total cost.

_____

He pays with a £5 note and receives four coins as change. Which coins were they?

_____

Jon buys three sausages, a meat pie and a can of fizzy drink. How much did he pay?

_____

Simon generously orders for both himself and his friend Duncan. He orders four items in total and receives £44.40 change from a £50 note. What did he order?

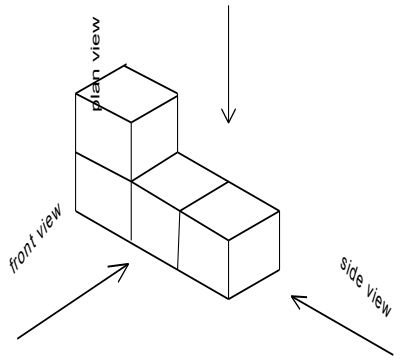
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SPACE FOR WORKING



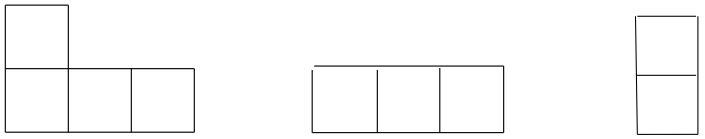
Answer

25. My youngest brother Joshua likes to play with bricks. One day he makes the following shape using four bricks:

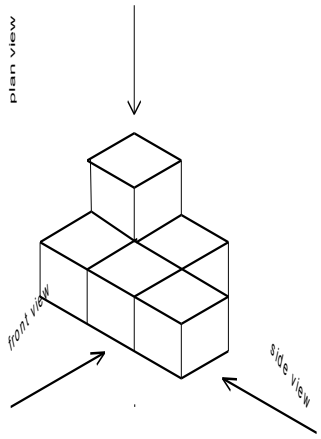



If you look at this three-dimensional object from the three different directions indicated above, the shape looks like:

Front View Plan View Side View



The next day Joshua makes a different shape using six bricks:




Draw the three views of this new shape below. The diagrams do not have to be to scale. A rough free-hand sketch is all that is required.

Front View Plan View Side View

Answer

26 The timetable below shows the morning train times between St Albans and City Thameslink via St Pancras International.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| St Albans | 0658 | 0708 | 0728 | 0722 | 0738 | 0744 | 0800 |
| Radlett | | | | 0727 | | 0749 | |
| Elstree | | | | 0731 | | 0754 | |
| West Hampstead | 0710 | | | 0745 | | 0803 | |
| St Pancras | 0717 | 0728 | 0748 | 0756 | 0800 | 0812 | 0820 |
| Farringdon | 0722 | 0732 | 0752 | 0800 | 0804 | 0816 | 0824 |
| City | 0727 | 0735 | 0755 | 0803 | 0809 | 0819 | 0827 |

At what time does the 0731 train from Elstree get to Farringdon? _____

How many minutes does the 0727 train take to travel from Radlett to City? _____

How many minutes longer does it take to travel from St Albans to West Hampstead on the 0722 train compared to the 0658? _____

What is the time of the latest train that someone could catch from St Albans in order to arrive at City no later than eight o'clock? _____

Roweena lives in St Albans and needs to arrive at St Pancras in order to catch the 0855 train to Paris. There is a 30 minute check-in at St Pancras International station and she allows herself an extra 10 minutes to change platforms. Roweena knows that it takes her 25 minutes to walk from her house to get to the platform at St Albans station. What is the latest time that she needs to leave her house?

_____

SPACE FOR WORKING



Answer

27. Look carefully at the following calculations:

$8^2 - 3^2 = 64 - 9 = 55$

$(8+3) \times (8-3) = 11 \times 5 = 55$

Work out, in the same way:

$9^2 - 5^2 =$ _____ – _____ = _____

$(9+5) \times (9-5) =$ _____ × _____ = _____

What do you notice about these pairs of answers? _____

This pattern can be used to work out some harder calculations. For example, the difficult sum, $68^2 - 32^2$ can easily be worked out to be:

$(68+32) \times (68-32) = 100 \times 36 = 3600$

Use this method to work out:

$552^2 - 448^2 =$ _____ = _____ = _____

$8.5^2 - 7.5^2 =$ _____ = _____ = _____

$\left(\frac{19}{37}\right)^2 - \left(\frac{18}{37}\right)^2 =$ _____ = _____ = _____

$25001^2 - 24999^2 =$ _____

= _____ = _____

SPACE FOR WORKING

Answer

28 The diagram below shows the roads connecting eight villages. The numbers next to each road (not drawn to scale) show the distances in miles for each stretch of road. Isobel travels from S to T on her journey to work each day. Find the shortest distance from S to T and state the route taken:

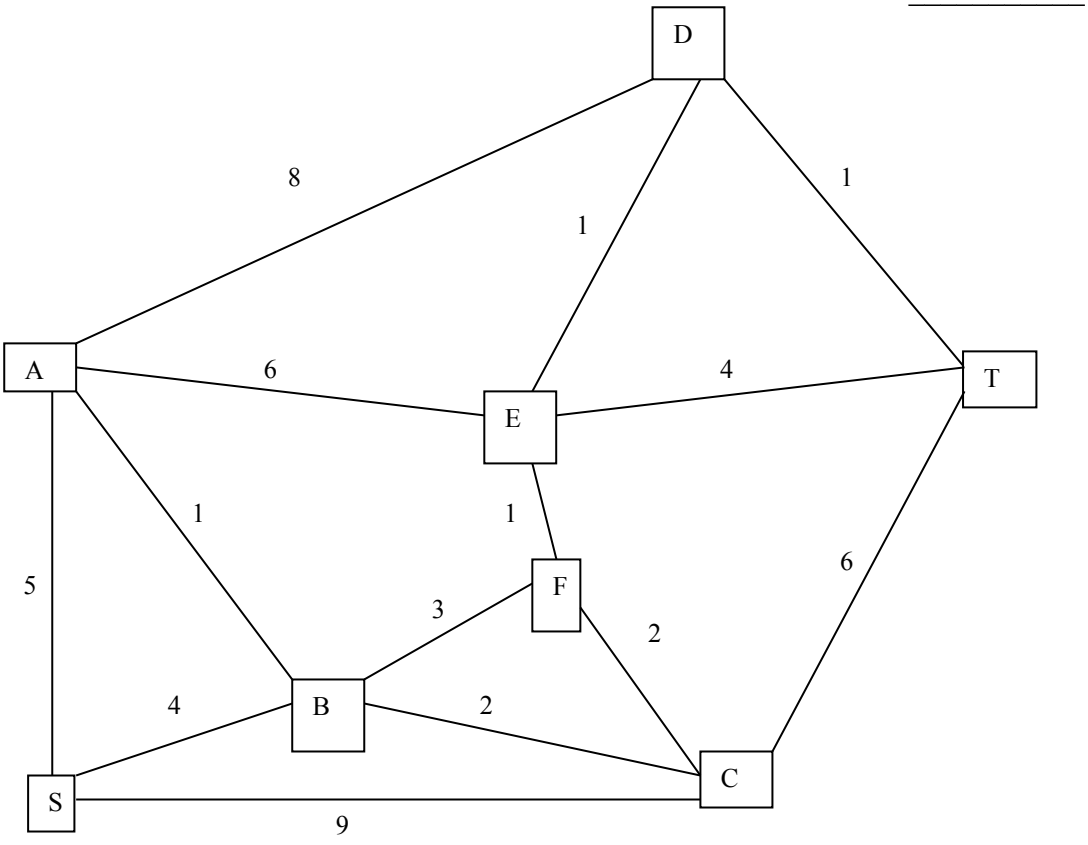
Shortest distance _____

Route: From S to _____ to T

Isobel cycles at a steady speed of 15 miles per hour. Find the shortest time to complete the journey. Give your answer in minutes. _____

Isobel listens to the local radio before setting off on her journey one morning. She discovers that the road between E and F is completely blocked due to an earlier accident and she is forced to choose an alternative route to work. What is the least number of **additional** minutes that she will take to cycle to work today?

_____




SPACE FOR WORKING



Answer

29. A person's Body Mass Index (BMI) is worked out by dividing their weight (in kilograms) by the square of their height (in metres). A person is then classified as "underweight", "normal", "overweight" or "obese" according to the following table:



| BMI | Classification |
|---|---|
| 18.5 or less | Underweight |
| Between 18.6 and 24.9 | Normal |
| Between 25.0 and 29.9 | Overweight |
| 30.0 or more | Obese |

For example, Jill weighs 72 kg and is 1.82 m tall. Her body mass index is worked out as follows:

$$\text{BMI} = \frac{72}{1.82^2} = 21.7$$ which is between 18.6 and 24.9 so Jill is "normal".

At the bottom of this page you will find the results of lots of calculations, some of which are relevant to the questions below. The one that has been circled was used to find Jill's BMI.

If Jack weighs 84 kg and is 1.71 m tall, calculate his BMI. _____

State whether Jack is underweight, normal, overweight or obese. _____

If Jon weighs 27300 grams and is 98 cm tall, calculate his BMI. _____

Jeremiah is 2.1 m tall and is obese. What is the lowest weight that he could be? _____

Josephine currently weighs 53 kg. She has a BMI of 16 so is currently classified as underweight. What is the least extra weight that she needs to put on if she is to be re-classified as normal? _____

SPACE FOR WORKING

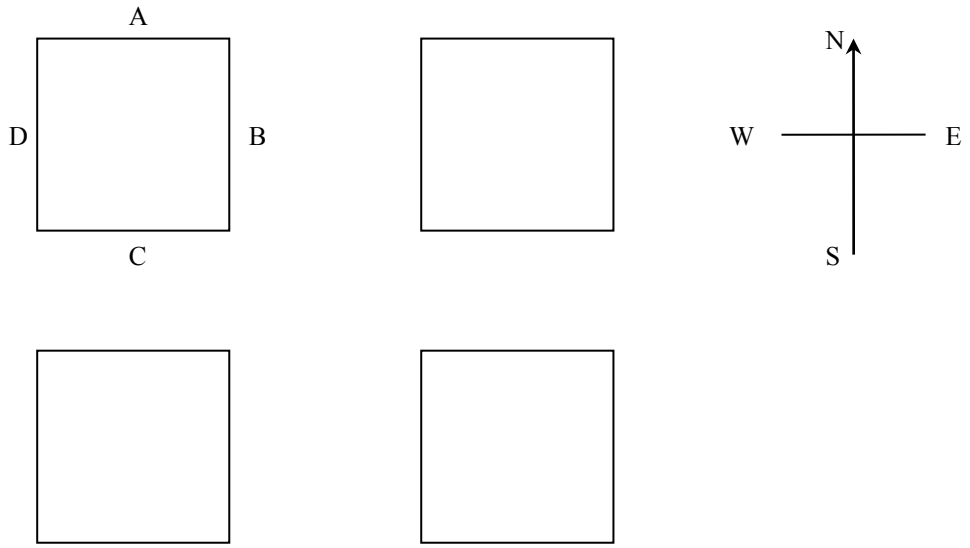
$\frac{84}{1.71^2} = 28.7$ $\frac{27300}{98^2} = 2.84$ $\frac{132.3}{2.1^2} = 30$ $\frac{27.3}{0.98^2} = 28.4$

$\frac{72}{1.82^2} = 21.7$

$\frac{53}{16^2} = 0.21$ $\frac{110.25}{2.1^2} = 25$ $\frac{53}{1.82^2} = 16$ $\frac{61.6}{1.82^2} = 18.6$

Answer

30. Four friends, Archibald, Bertram, Camilla and Daphne go on holiday together on the French Riviera. On the first evening at the hotel they sit down to dinner at a square table shown below. Archibald insists that he sits facing South so that he can have a clear view of the Mediterranean Sea, whilst Bertram and Camilla decide to sit next to each other. Show the four possible seating arrangements on the diagrams below. The first one has been done for you.




On the second day of the holiday, Archibald relents and graciously allows anyone (including himself) to face the sea, although Bertram and Camilla still choose to sit next to each other. How many possible arrangements are there now? _____

On the last day of the holiday, all four friends decide that they can sit where they like. How many possible arrangements are there now? _____

SPACE FOR WORKING

**Now go back and check your answers carefully.**