The Haberdashers' Aske's Boys' School
Elstree

11+ Entrance Examination 2014

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: $29+35$ _____

2. Subtract: $92-67$ _____

3. Multiply: 34×9 _____

4. Divide: $87\div3$ _____

5. Write the number twenty-four thousand and twenty-four in figures. _____

6. Round 567 to the nearest 100. _____

7. What number do you multiply 0.2 by to get an answer of 6? _____

8. If 7 tennis lessons cost £167.65 what is the cost of 1 lesson? _____

9. The safety notice in a lift reads:

Maximum 6 persons 580 kilograms

   The weights of the first five people to enter the lift are 90 kg, 80 kg, 95 kg,115 kg and 89 kg.

   What is the maximum weight of the sixth person in the lift if they all travel together safely? _____

10. Each branch of the flowering shrub, *Mathematicus arithmetica* has 5 stems. Each stem has 8 flowers and each flower has 11 petals. If a shrub has 3 branches, how many petals does it have? _____

SPACE FOR WORKING

Answer

11. Write down two numbers which differ by 2 and multiply to 168. ____ and ____

12. Find the sum of all the numbers between 7 and 19 which are divisible by 4. _____

13. Five miles is the same distance as eight kilometres. Use this fact to convert:
    20 miles into kilometres _____
    40 kilometres into miles. _____

14. If 1590 sweets are shared equally between 122 children, how many sweets do they each get and how many are left over?
    _____ each and _____ left over

15. Hermione is 11 years old and her mother is 43 years old. How old will Hermione be when her mother is 12 times as old as Hermione was 7 years ago? _____

16. Suzie is given a number and told to divide it by 2 and then subtract 14. Although Suzie starts with the correct number she gets in a muddle and multiplies by 2 and then adds 14 instead. If her final answer is 142, what answer should she have got? _____

17. The cost of 3 apples, 5 oranges and 2 grapefruit is £3.02.
    The cost of 5 apples, 7 oranges and 4 grapefruit is £5.12.
    What is the total cost of one of each type of fruit? _____

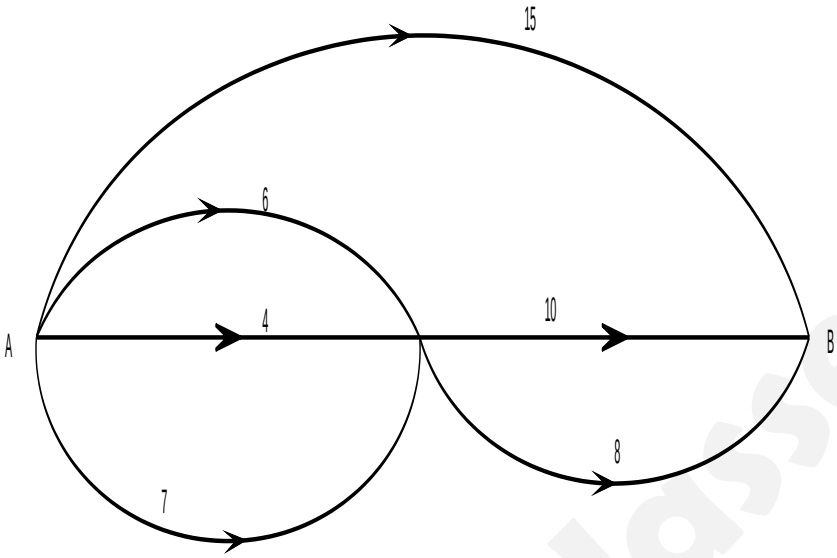
18. Children are offered a 25% discount on the cost of an adult ticket to visit Hamshaw House. Senior citizens are given a 20% discount.
    If a child's ticket costs £30, how much does a senior citizen pay? _____

SPACE FOR WORKING

Answer

19. The diagram shows the one-way cycle paths in a town. The diagram is not to scale but the distance along each section of the route is shown and is measured in kilometres.

How many possible routes are there in total from A to B? _____
How long is the shortest distance from A to B? _____ km



20. A tortoise and a hare take part in a race which has a staggered start in order to make the race fair.

The hare needs to run a distance of 400 metres to cross the finishing line whereas the tortoise only needs to travel 1.5 metres. The hare runs at a speed of 800 metres per minute. At what speed (in metres per minute) does the tortoise need to run to cross the finishing line at the same time as the hare?

_____ metres per minute

SPACE FOR WORKING

Answer

21. John experiments by rolling a single dice and a spinner simultaneously.
He rolls an ordinary dice with a possible score of 1, 2, 3, 4, 5 or 6.
At the same time he also spins a spinner with a possible score of 0, 1, 2 or 3.
His total score is worked out by **multiplying** the two individual scores together.

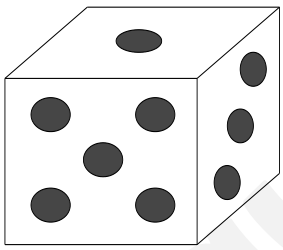
Complete the table below to show all 24 equally likely final scores.

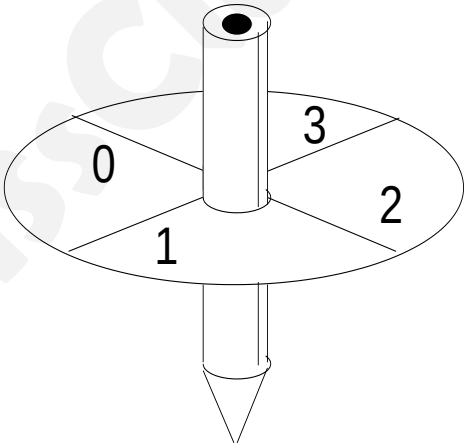
Score	1	2	3	4	5	6
0						
1			3			
2						12
3				12		

If he repeats this experiment lots and lots of times, what fraction of the total scores are

(a) 0 _____

(b) 12 or more? _____



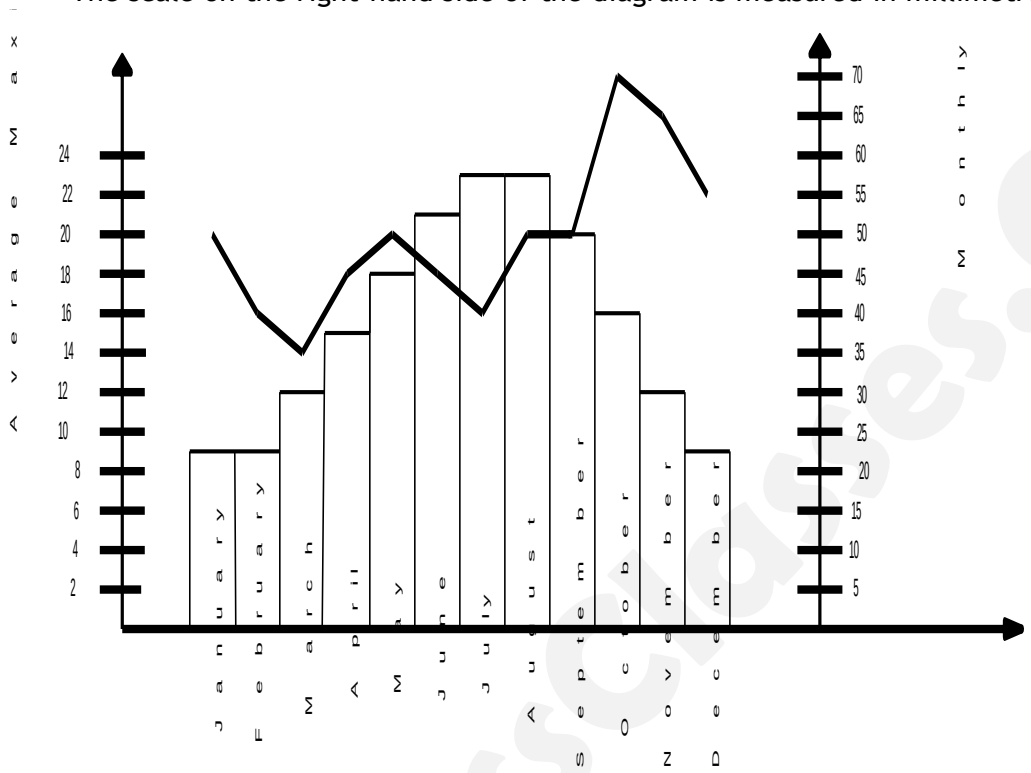


SPACE FOR WORKING

Answer

22. The **bar chart** shows the average maximum monthly temperature for London.
The scale on the left-hand side of the diagram is measured in degrees Centigrade.

The **line graph** gives the total monthly rainfall for London.
The scale on the right-hand side of the diagram is measured in millimetres.



What is the average maximum temperature in October? _____

Which two months are the hottest? _____ and _____

Which is the driest month of the year? _____

The average rainfall for the first three months of the year is

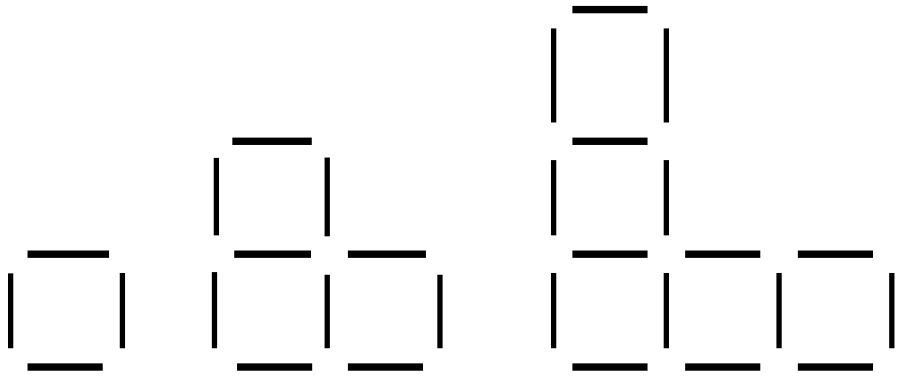
$$\frac{50+40+35}{3}=\frac{125}{3}=41\frac{2}{3}\text{ mm}$$

Work out the average rainfall for the last three months. Give your answer as a mixed fraction.

_____

SPACE FOR WORKING

23. Amar makes patterns out of sticks:



Pattern 1 Pattern 2 Pattern 3

Draw Pattern 4 and complete the table.

Pattern Number	Number of Sticks
1	4
2	10
3	16
4	
7	
	70

Pattern 4

SPACE FOR WORKING

Answer

24. The time in Adelaide (Australia) is 8 hours 30 minutes **ahead** of the time in London. The time in San Francisco (America) is 8 hours **behind** the time in London.

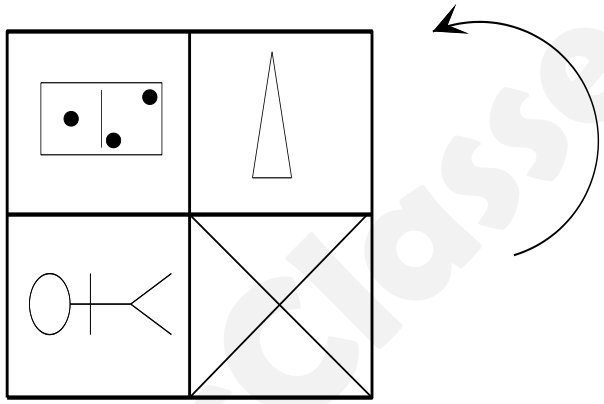
If it is 8:45 pm on 10th January in Adelaide what is the time and date in London?

Time is _____ and date is _____

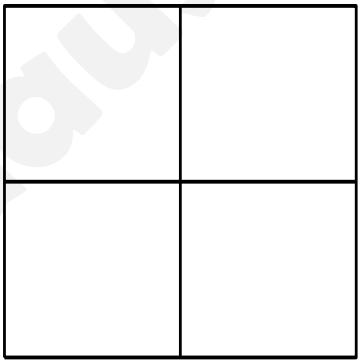
If it is 9:23 am on 30th September in San Francisco what is the time and date in Adelaide?

Time is _____ and date is _____

25. Mr T has designed the kitchen tile shown below:



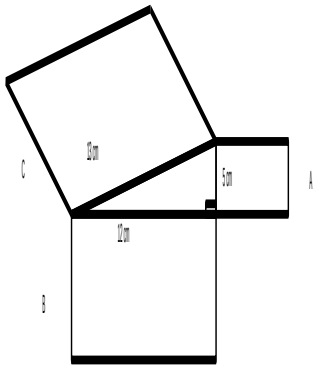
Show what this tile will look like after it has been turned through ninety degrees anti-clockwise.



SPACE FOR WORKING

Answer

26. The diagram below (not to scale) shows three squares stuck onto the sides of a right-angled triangle with sides of lengths, 5 cm, 12 cm and 13 cm.



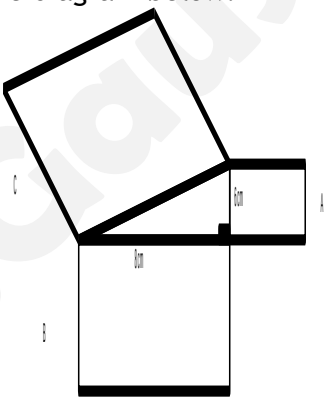
Complete the table to show the area of each square and hence write down a simple connection between the areas of the squares A, B and C.

Square	Area of Square
A	25 cm^2
B	144 cm^2
C	

Connection between the areas of squares, A, B and C: _____

_____

Assuming that this connection works for all right-angled triangles, work out the length of square C in the diagram below:



Length of square C: _____

SPACE FOR WORKING

Answer

27. My friend George is really good at maths so I decide to ask him some tricky questions to see if I can catch him out. Needless to say he got all three questions right!

Write George's answers in the spaces provided.

George's Quiz

Question 1

If it takes 90 minutes for two identical towels to dry on a washing line, how long would three of these towels have taken to dry?

_____

Question 2

In the winter, I try and climb up an icy slope starting at the bottom. Each time I make a move I find that I go up four metres but then slide back down two metres. How many moves do I need to get to the top which is 8 metres up the slope from the bottom?

_____

Question 3

The area of mould growing on my bathroom wall doubles every day. After 13 days the area covered is 2880 cm^2 . After how days did the area first exceed 300 cm^2?

_____

SPACE FOR WORKING

Answer

28. We write $S(2,5)$ as an abbreviation for $2+3+4+5$ so that $S(2,5) = 14$.

Similarly,

$S(6,39) = 6+7+8+9+....+38+39 = 765$

Work out:

$S(1,3)$ _____

$S(6,40)$ _____

$S(7,38)$ _____

$S(1,2) - S(2,3) + S(3,4) - S(4,5) + ... - S(18,19) + S(19,20)$ _____

29. Freddie writes down all whole numbers between 1 and 1000 inclusive:

1, 2, 3, 4, …., 9, 10, 11, 12, 13, ….,99, 100, 101, 102, 103, …., 999, 1000.

How many individual digits does he write down? _____

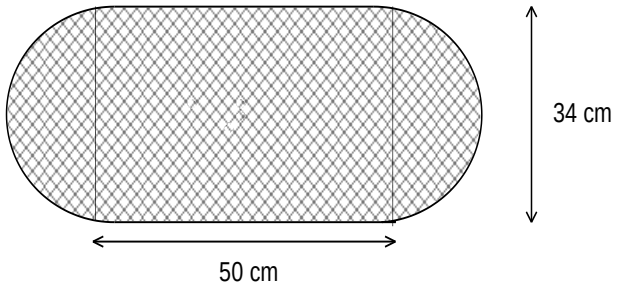
SPACE FOR WORKING

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

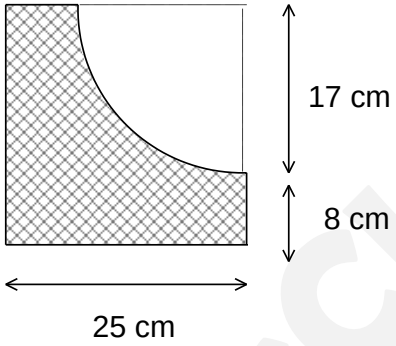
Answer

30. The area of a circle with diameter 34 cm is 908 cm^2.

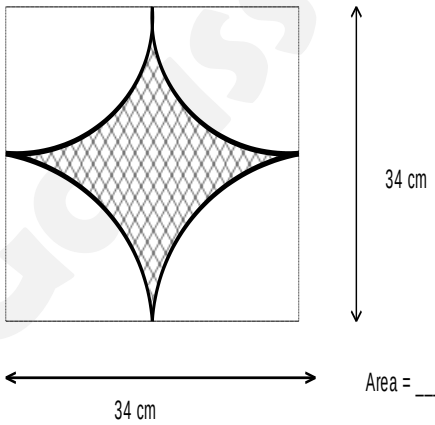
Use this fact to work out the area of each of the shaded regions shown in the diagrams (not drawn to scale) below.



Area = _____



Area = _____



Area = _____

SPACE FOR WORKING

Now go back and check all of your answers carefully.