The Haberdashers' Aske's Boys' School
Elstree



11+ Entrance Examination 2010

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: $24 + 91$ _____

2. Subtract: $72 - 38$ _____

3. Multiply: 43×6 _____

4. Divide: $76 \div 2$ _____

5. What is the total number of players in 32 five-a-side football teams? _____

6. If 161 sweets are shared equally between 7 people, how many sweets does each person receive? _____

7. The Eiffel tower in Paris was built in 1889 and is 1051 feet tall. In 1931 New York's Empire State Building was completed which is 1472 feet tall.

   How many years elapsed between the building of the Eiffel tower and the Empire State? _____

   What is the total height of these two buildings? _____

8. If March 23rd is a Monday, on what day of the week is April 2nd? _____

9. If I face West and turn 270 degrees clockwise, in which direction am I now facing? _____

10. If the number 4,567 is multiplied by 5 and then multiplied by 2, what is the final answer? _____

    If the number 40,505 is divided by 25 and then multiplied by 5, what is the final answer? _____

SPACE FOR WORKING





Answer

11. If 9 bananas cost £1.23 find the cost of 12 bananas. _____

12. Work out $(57+56+55+54)-(56+55+54+53)$ _____

13. Which one of the following fractions is **not** equivalent to $\frac{3}{5}$;

$\frac{12}{20}, \frac{30}{50}, \frac{18}{30}, \frac{21}{35}, \frac{9}{25}, \frac{27}{45}$? _____

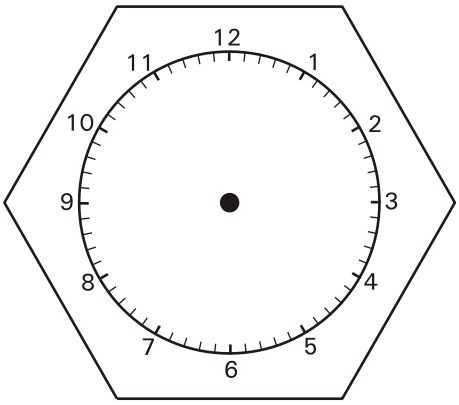
14. Which of the numbers 20, 25, 30, 35, 40, 45, 50, 55 is nearest to the value of $6.9201\times\sqrt{26}$? _____

15. A train leaves Stevenage at 0942 and arrives in York at 1134. How many **minutes** does the journey take? _____

16. In the 24-hour clock, the time is 21:30.

Write this time as a 12-hour clock, using am or pm. _____

Draw the hour and minute hands on the clock below to show this time.



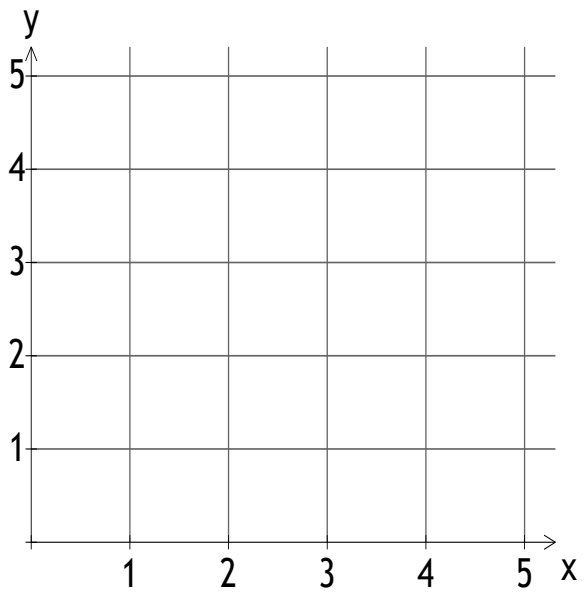
SPACE FOR WORKING

Answer

17. On the grid below, plot and label the points with coordinates:

A(1,4), B(2,2) and C(4,3)

Write down the coordinates of a fourth point D which makes the shape ABCD a square. _____



18. When a rope is cut equally into 8 pieces it is discovered that each piece is a whole number of centimetres long. The same thing happens if this rope is cut into 6 pieces. What is the shortest length that this rope could be?

_____

19. The numbers 34 and 55 are two examples of two-digit numbers which are made up using the digits 3, 4 and 5. How many two-digit numbers in total can be made using some or all of the digits 3, 4 and 5?

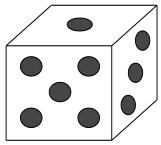
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SPACE FOR WORKING

Answer

20. [In this question note that 1 is NOT a prime number.]

The diagram below shows an ordinary die.



Consider the following events when a single die is rolled:

A: "the score on the die is either a 5 or a 6"
B: "the score on the die is an even number"
C: "the score on the die is a prime number"
D: "the score on the die is a multiple of 3"

Write one of the following phrases in the spaces below to make each statement correct.

"has the same chance of happening as"
"is more likely to happen than"
"is less likely to happen than"

A _____ B

B _____ C

C _____ D

21. Look carefully at the following five supermarket offers:

A	Buy one get one free.
B	Buy one get the second for half price.
C	Buy two get one free.
D	Buy four and pay only for three.
E	One-third off all prices.

Two pairs of these offers actually give the same value for money. Write down the letters representing both of these pairs in the spaces below:

_____ and _____ give the same value for money, and

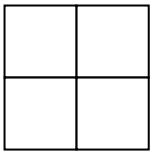
_____ and _____ give the same value for money.

SPACE FOR WORKING



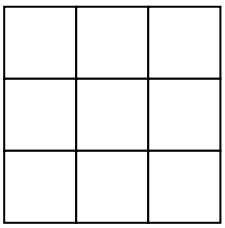
Answer

22. The diagram below consists of one 2 by 2 square split into four 1 by 1 squares. The total number of squares that you can see in the diagram is therefore 5.



For each of the diagrams below fill in the spaces to work out the total number of squares that you can see.

(a)

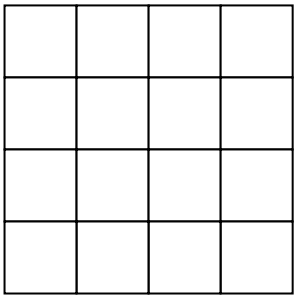


There are

_____ 3 by 3 squares _____ 2 by 2 squares ____ 1 by 1 squares

so the total number of squares in a 3 by 3 square is _____

(b)



There are

__ 4 by 4 squares __ 3 by 3 squares __ 2 by 2 squares __ 1 by 1 squares

so the total number of squares in a 4 by 4 square is _____

(c) By making use of the pattern that you have observed in the previous parts of this question, work out the total number of squares in a 5 by 5 square:

_____

SPACE FOR WORKING

23. In the computer game “Fizz Darkweek” a player scores points by hitting certain targets:

“Zoid” scores fifty thousand,
“Yondo” scores forty thousand,
“Xenox” scores two thousand five hundred.

Also, if you hit two Xenox **in a row** you get an extra five hundred bonus points.

Amir plays the game and only hits one target which is a Zoid. Write down his score **in figures**:

_____

Ben hits one of each. Work out his total score. Give your answer **in words**.

_____

Catherine goes next and hits a Yondo first, followed by two Xenox and finishes off with a second Yondo. Work out her total score. Give your answer **in figures**.

_____

Finally it is Debbie’s turn. She has four shots on target with a total score of ninety-five thousand points . Write down one possible set of targets that she might have hit:

First Shot _____

Second Shot _____

Third Shot _____

Fourth Shot _____

SPACE FOR WORKING



24. Thomas, Henry, Edward and Gordon are four season-ticket holders travelling by the same train. Thomas' ticket allows him to get out at either Brasted, Westerham or Dunton Green; Henry's ticket is for Knockholt or Dunton Green; Edward's for Dunton Green or Sevenoaks; Gordon's for Brasted or Knockholt.

No one gets out at either Sevenoaks or Westerham, and only one person at Knockholt and one at Dunton Green.



At what station did these four passengers get off the train?

Thomas _____

Henry _____

Edward _____

Gordon _____

25. Of the 26 boys in a class, 21 are right-handed. If 10 of the boys in the class wear glasses, what is the least number of boys in the class who are both right-handed and wear glasses?

_____

26. Four friends, Alwyn, Bax, Coates and Delius have lunch together. Although each eats a differently priced snack, they share the bill equally. Yesterday, this resulted in Alwyn paying £1 less than the cost of his snack, Bax paying £3 more, Coates £4 less and Delius paid £4. What was the actual price of the snack that each friend ordered?

Alwyn: _____

Bax: _____

Coates: _____

Delius: _____

SPACE FOR WORKING

Answer

27. Work out the following:

(a) 3 + 5 + 7 + 9 = _____

(b) 20 + 25 + 30 + 35 + 40 = _____

Work out the following:

(i) Multiply the average of 3 and 9 by 4 to get _____

(ii) Multiply the average of 20 and 40 by 5 to get _____

What do you notice about your answers to (a) and (b), and your answers to (i) and (ii)?

_____

If you add a string of numbers which go up by the same amount each time you can work out the sum by finding the average of the first and last, and multiplying the answer by the number of numbers. Use this result to work out:

143 + 162 + 181 + 200 + 219 + 238 + 257 = _____

Use this approach to work out the sum of the numbers 2, 6, 10, 14, 18 and so on, as far as 58 (including the number 58).

_____

SPACE FOR WORKING

Answer

28. In ordinary arithmetic, numbers are given in base 10 which means that for a number written as 469 there are 4 hundreds, 6 tens and 9 units so that

$$469 = 4\times100 + 6\times10 + 9\times1$$

In base 5, only the digits 0, 1, 2, 3 and 4 are used. Instead of the columns representing hundreds, tens and units they now indicate how many twenty-fives, fives and units there are so the number 324 in base 5, represents 3 twenty-fives, 2 fives and 4 units so that

324 (base 5) = $3\times25 + 2\times5 + 4\times1 \;=\; 75 + 10 + 4 \;=\; 89$ (base 10)

Use this process to convert the numbers 13 and 341, both given in base 5, into base 10:

13 (base 5) = _____ (base 10)

341 (base 5) = _____ (base 10)

It is possible to work backwards converting a number from base 10 to base 5.

As an example, to convert 73 from base 10 to base 5 you could write:

$$73 \;=\; 50 + 20 + 3 \;=\; 2\times25 + 4\times5 + 3\times1$$

so in base 5 the number would be written as 243.

Use this process to convert the numbers 17 and 109, both given in base 10, into base 5:

17 (base 10) = _____ (base 5)

109 (base 10) = _____ (base 5)

SPACE FOR WORKING

Answer

29. The table below shows the prices of a week's holiday at four hotels in Orlando Florida during October this year. The prices are per person and a reduction is offered for **children aged 2 to 16 years old**. The prices include the cost of the flight and accommodation. **Infants under 2 years old travel free**. There is an option to buy tickets to the theme parks. Infants have free entry.

For example, if a family consisting of two adults and one child (aged 9) stay for a week at the Little Rodent Hotel the total cost of the holiday, including a rover theme park ticket for everyone, would be:

$$2\times1320+780+2\times320+240=£4300$$

Hotel	Cost per adult	Cost per child	Adult Rover Ticket	Child Rover Ticket
Little Rodent	£1320	£780	£320	£240
South Seas	£1450	£850	£320	£240
Holiday Mill	£1550	£900	£320	£240
Portomento Bay	£2050	£1040	£320	£240

Work out the total cost for a family consisting of two adults and three children (aged 9, 6 and 1) to stay at the Holiday Mill for a week, including the cost of rover theme park tickets.

_____

A family consisting of just one adult and a child (aged 11) decide to spend a week in Orlando. They are trying to choose between staying at the South Seas and Portomento Bay. How much more expensive will it be to stay at the Portomento Bay?

_____

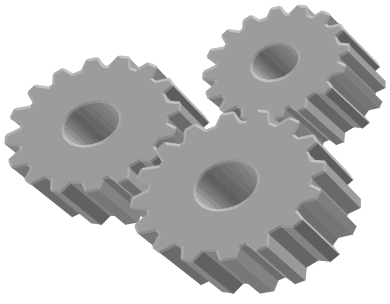
The Adams family consisting of two parents and their children aged 14 and 17 travel to Orlando for a week's theme park holiday. Before they leave the UK they buy their theme park tickets on-line using a special internet deal which provides a 25% reduction on all rover tickets. How much money do they save by buying these tickets on-line?

_____

The remaining cost of flights and accommodation for the Adams family is £5550. Which hotel did they stay at?

_____

SPACE FOR WORKING



Answer

30. In the square below each letter stands for a different number.

A	*C*	*D*	*B*	
A	*A*	*A*	*C*	
B	*D*	*D*	*D*	
B	*C*	*A*	*A*	*100*
112	*78*	*76*		

It is known that the four numbers in the second column add up to 78, and the four numbers in the third column add up to 76.

Use this information to work out the value of C. C = _____

The four numbers in the first column add up to 112 and the four numbers in the fourth row add up to 100.

Use this information to work out the remaining values of A, B and D.

A = _____

B = _____

D = _____

SPACE FOR WORKING

NOW GO BACK AND CHECK YOUR ANSWERS CAREFULLY