

SCHOLARSHIP EXAMINATION

MATHEMATICS

2008

Time: 1 hour

Name:

School:

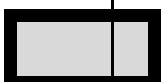
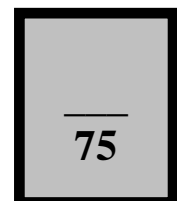
Non Calculator

Do not worry if you find some of the questions very hard.

They are supposed to be.

It is very rare for candidates to answer all questions.

Just do as much as you can in the time available.



1) Find the answers to these. Give the answer as a mixed number or as a fraction in its simplest form. YOU MUST SHOW YOUR WORKING.

a) $2\frac{1}{3} + 3\frac{3}{4} =$

_____ (1)

b) $3\frac{1}{4} - 1\frac{5}{7} =$

_____ (2)

c) What is $\frac{4}{9} \div \frac{3}{8}$?

_____ (1)

d) What is $\frac{3}{7} \times \left[\frac{1}{5} + \frac{2}{3} \right]$?

_____ (2)

e) Given that $2a=b=\frac{c}{2}$, find the value of $\frac{1}{b}$.

$$\frac{1}{a} + \frac{1}{b} + \frac{1}{c} = 1$$

_____ (4)



2)

S is 25% of 60

60 is 80% of I

80 is $M\%$ of 25

What is $S + U + M$?

_____ (3)

3)

There are six different, three-digit numbers each containing all the digits 1, 3, 5, list them below.

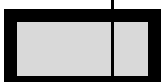
How many of these three-digit numbers are prime numbers ? Explain any reasoning. (1)

_____ (2)

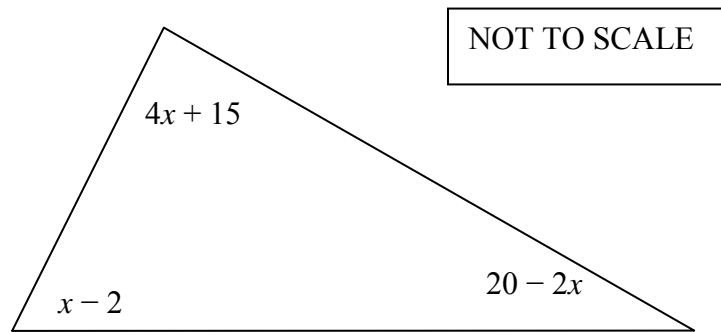
4)

What fraction of a 24-hour day does school take up, if school starts at 8.15am and finishes at 4.30pm ?

_____ (2)



- 5) Form an equation and then solve it to find the value of x .



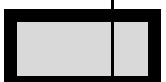
_____ (3)

- 6) How many two-digit numbers have digits whose sum is a perfect square?

_____ (4)

- 7) A singles tournament had six players. Each player played every other player only once, with no ties. If Hamish won 4 games, Isobel won 3 games, Jamie won 2 games, Kirsty won 2 games and Lachlan won 2 games, how many games did Murdo win?

_____ (3)



8) I have a racing snail that can cover 100 cm in 100 seconds. He is not very good over long distances. If he enters a race which is 20% longer he will go 20% slower.

a) What is my snail's percentage increase in time in the race which is 20% longer ?

_____ (3)

My snail is much better over shorter distances. If he enters a race which is 20% shorter he will go 20% faster.

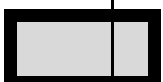
b) What is my snail's percentage reduction in time in the race which is 20% shorter ?

_____ (3)

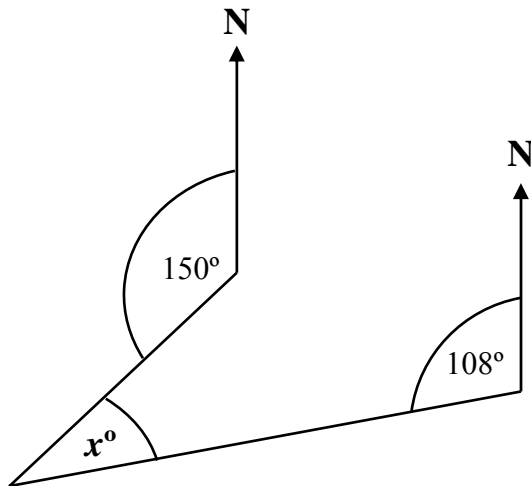
9)

I am thinking of a 2-digit number.
When it is divided by 3 the remainder is 1.
When it is divided by 4 the remainder is 2.
When it is divided by 5 the remainder is 3.
When it is divided by 6 the remainder is 4.
What number am I thinking of?

_____ (3)



10) Find the value of x°



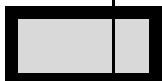
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_____ (3)

11)

I think of a number, add 3 and then multiply the answer by 5.
I then add the original number to the result and take away 3. The new answer is divided by 2. What is the answer always a multiple of?
Try to prove by using algebra.

_____ (3)

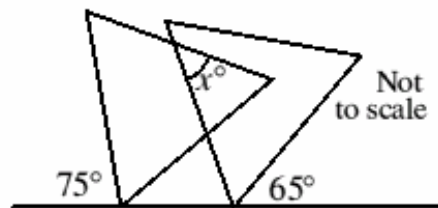


- 12) At a holiday camp the ratio of boys to girls is 3:4 and ratio of girls to adults is 5:7. The ratio of adults to supervisors is 8 to 1. What is the ratio of *children* to supervisors at the camp?

_____ (3)

- 13)

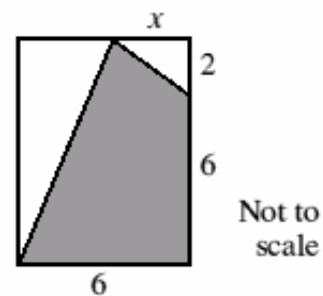
The diagram shows two equilateral triangles what is the size of angle x ?



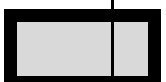
_____ (2)

- 14)

Two thirds of the rectangle below has been shaded. What is the value of the length x ?



_____ (2)

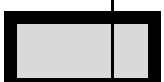


15) A T-shirt marked down by 20% in a sale was sold for £14.40. What was the original marked price before the sale?

_____ (2)

16) Two members of Lothian were making Christingles for the Carol Service. One bought 200 oranges and 220 candles at a cost of £65.60. The other bought 210 oranges and 200 candles at a cost of £63.30. They actually only needed 200 of each. How much should it have cost them?

£ _____ (4)



17) Find the 100th term in the sequence 5, 8, 11, ...

_____ (3)

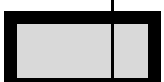
18)

Each of the letters stands for a unique digit (1 to 9).
Work out what value each letter can have. Explain any reasoning
as you eliminate possibilities or make deductions.

$$\begin{array}{r} \text{C R O S S} \\ + \text{R O A D S} \\ \hline \text{D A N G E R} \end{array}$$

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| C | R | O | S | A | D | N | G | E |
| | | | | | | | | |

(4)



19)

a) The length of a rectangle is 15m more than its width. Its area is 450m^2 . Find the actual dimensions of the rectangle.

_____ (2)

c) The sides of a right-angled triangle are x , $(x+2)$ and $2(x-1)$. The hypotenuse is the last mentioned term above. What are the measurements of the triangle?

_____ (4)

20) In a magic square each row, column and diagonal add to the same number. Complete this square.

| | | |
|----|----|----|
| 14 | 3 | |
| | | 13 |
| 6 | 15 | |

_____ (4)

END OF PAPER

