BENENDEN

Lower School Scholarship 2018

Mathematics

13+

1 Hour

Full Name: _____

Current school: _____

Date: _____

Instructions to Candidates:

Answer ALL questions in the spaces provided in this book.
Calculators may not be used.
The total number of marks for the paper is 75

Answer ALL of the questions in the spaces below.

1. (a) Simplify

(i) $4x+5y-2x-6y$

.....

(2)

(ii) $3x^2-4x-2x^2-5x$

.....

(2)

(b) Expand the brackets

(i) $5(2x-3)$

.....

(2)

(ii) $m(3n-m^2)$

.....

(2)

(c) Expand and simplify $4(3c+2)-3(5c-2)$

.....

(2)

(d) Expand and simplify $(2x+3)(3x-5)$

.....

(3)

(e) Factorise $12rt^3 + 18r^2t^2$

.....

(2)

(Total 15 marks)

2. Solve these equations:

(a) $6x - 1 = 2$

.....

(2)

(b) $3(2x - 5) + 31 = 10$

.....

(3)

(c) $\frac{1 - 4x}{3} = 3$

.....

(3)

(d) $43 - 2x = 7 - 8x$

.....

(3)

(Total 11 marks)

3 (a) Find the next two terms of the linear sequence 23, 17, 11, 5, …

…… , ……

(2)

(b) Find the formula for the sequence given in (a)

……

(2)

(Total 4 marks)

4. ***ALL WORKINGS MUST BE SHOWN.***

Calculate the following, giving your answers as mixed numbers.

(a) $3\frac{2}{5} - 1\frac{5}{7}$

……

(3)

(b) $3\frac{2}{3} \div 1\frac{1}{6}$

……

(3)

(Total 6 marks)

5. (a) Write 48 as a percentage of 60

……

(2)

(b) Increase £72 by 25%

……

(2)

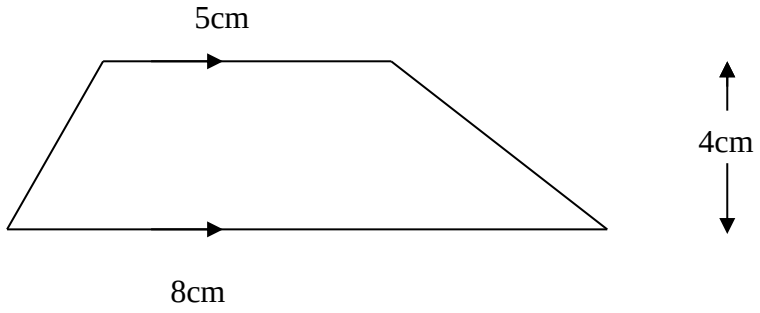
(Total 4 marks)

6. Karen went ice-skating one Saturday afternoon. 60% of the people there were male. There were 56 females. How many people were there altogether?

……

(Total 3 marks)

7. The cross-section of a prism is shown below.



The prism has a volume of $3900mm^3$. Find the length of the prism.

……

(Total 3 marks)

8. Solve the simultaneous equations

$$4x + 5y = 7$$
$$2x - 3y = 9$$

……
(Total 3 marks)

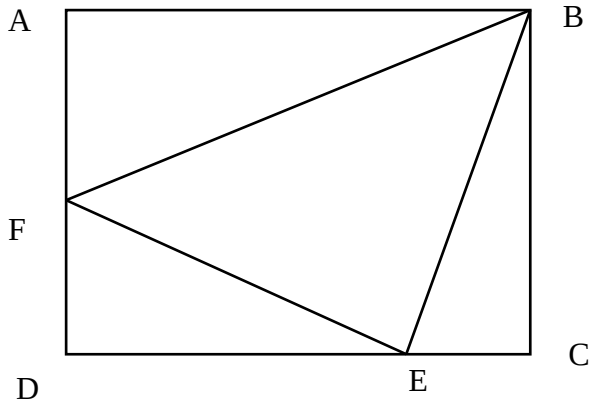
9. Two numbers add up to 30 and multiply to give 144. What is their difference?

……..
(Total 4 marks)

10. What fraction is exactly half way between $\frac{1}{3}$ and $\frac{1}{2}$?

…….
(Total 3 marks)

11. In the diagram ABCD is a square. AB = BC = 4m, DE = 3m and DF = 2m. Find the area, in m^2, of triangle BEF.



……..

(Total 4 marks)

12. If x and y are positive numbers, which of the following is the biggest. Show all your reasoning.

xy, $x^2 + y^2$, $(x + y)^2$, $x^2 + y(y + x)$

……

(Total 3 marks)

13.

To make concrete, Ben mixes 2 parts of cement with 5 parts of sand.

(a) To lay the foundations for a garage, Ben uses 60kg of sand. How many kilograms of cement does he use?

……..

(2)

b) On another project, Ben uses 75kg of cement. How much sand does he use?

……..

(2)

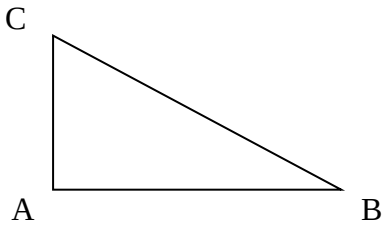
c) If he produces 420kg of concrete, how much of each ingredient will be needed?

……..

(2)

(Total 6 marks)

14.



a) In the diagram above, triangle ABC is a right-angled triangle.
Given that AB = 12 cm and BC = 15 cm, find the length of the side AC.
SHOW ALL OF YOUR WORKING.

.....
(4)

(i) What is the area of triangle ABC?

.....
(2)
(Total 6 marks)

Total Marks: 75

Do not attempt this page until you have done all that you can of the other questions and have checked your answers.

Peter and Paul

Peter and Paul each had a different sum of money in whole pounds. Peter gave Paul as many pounds as Paul started with. Paul saw how much money Peter had left and gave him back the same amount. Peter then did the same again, giving Paul the same amount as he (Paul) had left. Peter now had no money left, but Paul ended up with £80. How much did each start with?

……..

……

……..

Planes

Every half hour, on the half hour, an aeroplane leaves Paris for Madrid, and at the same time, one leaves Madrid for Paris. The trip either way lasts 2.5 hours, how many planes from Paris pass one from Madrid in mid-air?

……

……

……..

Heads or Legs

When asked how many hens and pigs he had a farmer replied:

'I have 30 heads and 70 legs'

How many hens and pigs did he have?

……

……

……..