13+

ENTRANCE EXAMINATION

PAST PAPER

MATHEMATICS

ONE HOUR

Name: ……………………………………………………

School: ……………………………………………………

Answer all of the questions.

1. Calculate the following, showing your working each time.
Remember, **you must not use a calculator** for this question.
If you only show the answer you will receive NO marks.

(a) $128.5 - 34.9$

……………………….(1)

(b) $46.9 + 303.56 - 89.09$

……………………….(2)

(c) 432×23

……………………….(1)

(d) $\dfrac{15.6}{1.2}$

……………………….(1)

[5]

2. Without using a calculator, **and showing all of your working**, work out the following:

(a) Express $\dfrac{1}{8}$ as a percentage

……………………….(2)

(b) Convert a score of 28 out of 40 marks to a percentage

……………………(2).

(c) Calculate 21% of £565

……………………….(2)

[6]

3. Simplify the following:

(a) $x^2 + 6x + 7x^2 - 9x$

..............................(2)

(b) $4m^3 \times 5mn^2 \times 2m^2n$

..............................(2)

(c) $2(b-3)+4$

..............................(2)

(d) $-(x^2+5)-3(2-2x)$

..............................(2)

[8]

4. Solve the following equations, taking care to show your algebraic method:

(a) $2+3x=14$

..............................(2)

(b) $16-2x=7$

..............................(2)

(c) $\dfrac{7+x}{4}=5$

..............................(2)

(d) $5(2x+3)=27$

..............................(3) **[9]**
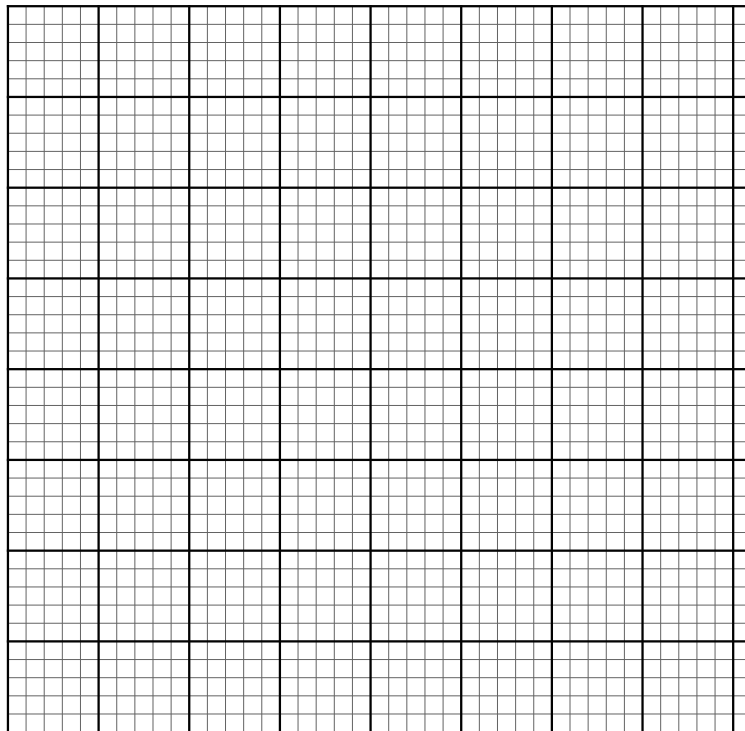
5. (a)   Plot the following points on the graph paper below using the most appropriate scale to use as much of the graph paper as possible:

$$A(1,2),\ B(2,5),\ C(5,5),\ D(4,2)$$

(2)
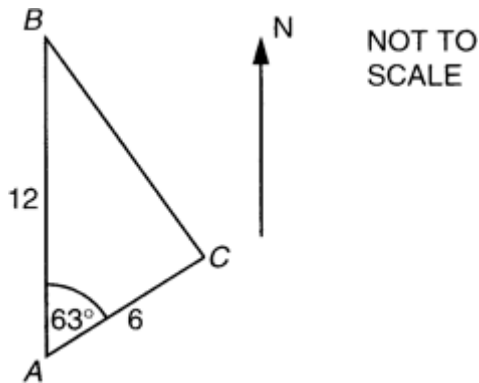
(b)   What is the mathematical name for the shape *ABCD*?

……………………..(1)

(c)   Calculate the area of this shape.

……………………..(3)

[6]

6. The diagram shows the positions of points *A*, *B* and *C* .
   B is 12 miles due North of *A*.
   C is 6 miles from *A* on a bearing of 063°.

(a) Use a scale of 1 cm to represent 1 mile to complete triangle *ABC* accurately.

The line *AB* has been drawn for you.

(2)

(b) Use the scale drawing to find

    (i) the actual distance *BC*,

…………………....(1)

    (ii) the bearing of *C* from *B*. …………………....(1) **[4]**

7. Solve the following:

(i) $4x+3 = 2(x-1)$

.... (3)

(ii) $3(2x+1) = 4(2-x)$

....................(4)

[7]

8. Calculate the values of the following given that $a = -1, \ b = -2, \ c = 3, \ d = 5$:

(a) $a^2 - b^2$

.........................(2)

(b) $abc + bcd$

.........................(2)

(c) $a^3 - 2a$

.........................(2)

(d) $\sqrt{d^2 - c^2}$

.........................(2)

(e) $(a+b)^2$

.........................(2)

[10]

8.

Not to scale
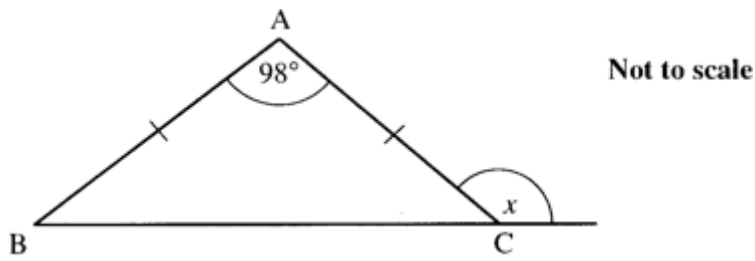
(a)   In the diagram, ABC is an isosceles triangle.
      Angle A = 98°.

      Work out angle *x*.

                                                                    …………………….(2)

(b)

Not to scale
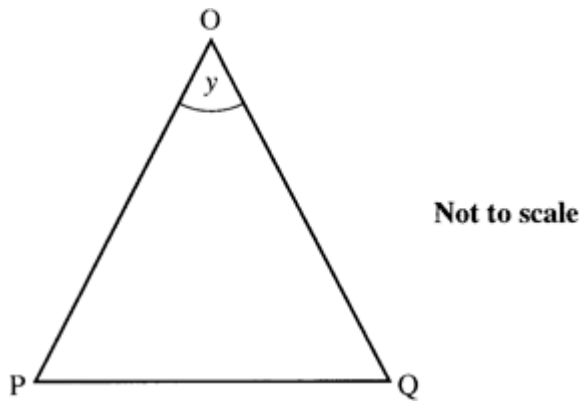
      O is the centre of a regular octagon.
      PQ is one side of this octagon.

      Calculate angle *y*.

                                                                    …………………….(2)

                                                                    [4]

9. For the following sequence:

$$9 \quad 5 \quad 1 \quad -3$$

(a) Write down the next two terms

....(2)

(b) Explain, using words, how the sequence is obtained

.......................(1)

(c) Write down the formula for the nth term

.......................(2)

(d) Calculate the 20th term

.......................(1)

(e) Find the value of n when the nth term is -95.

.......................(3)

[9]

10. This diagram shows a page in a newspaper.
Each of the columns of newsprint is the same width.
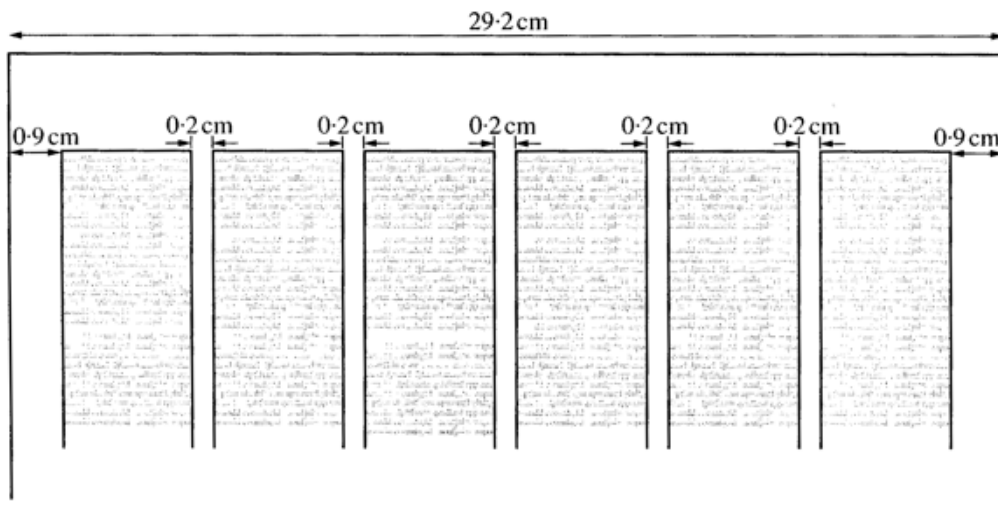
Work out the width of each column.

.......................(3)

[3]

11.

31 cm

12 cm

x

Not to scale

14 cm
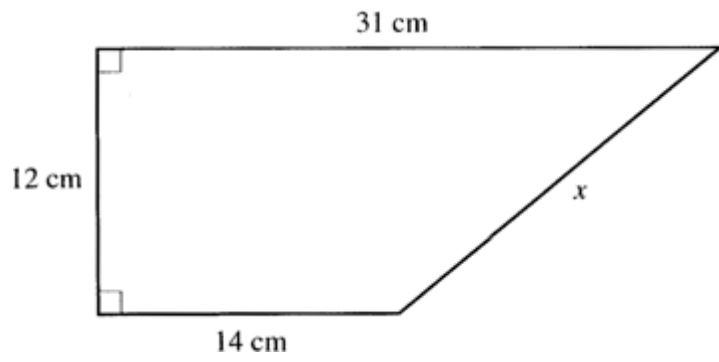
(a) Calculate the length marked x.

……..…………….(3)

(b) Find the area of the shape

…………………(3)

[6]