ALLEYN'S SCHOOL

SAMPLE PAPER

ENTRANCE & SCHOLARSHIP EXAMINATION

For 13+ candidates

MATHEMATICS

Time allowed: 1¼ hours

Calculators may be used except for the questions on the first two pages. Answer as many questions as you can. If you cannot do a question, leave it and go on to the next. Show your working, as there may be marks given for working out.

Mathematical Note for Candidates from Overseas

Decimal Separators

The symbol used to separate the integer part of a decimal from its fractional part is called the decimal point. In Britain, the decimal point is denoted by a period (eg 31.241). However, in some countries the notation is different. Many European countries use a comma in place of the decimal point (eg 31,241).

Candidates should be aware of the British system for decimal points and should note that questions will be set in this style. However, the candidate's own answer may be written in the style that is familiar to them.

MULTIPLE CHOICE

You are not allowed to use your calculator for these questions

1 The probability of drawing a red Ace from an ordinary pack of cards is:

A $\frac{1}{52}$ B $\frac{1}{26}$ C $\frac{1}{13}$ D $\frac{1}{4}$ E $\frac{1}{2}$

2 $5+6\div3-1=$

A 6 B 8 C $2\frac{2}{3}$ D 5.5 E $3.\dot{3}$

3 The mass of a saloon car is approximately

A 100 mg B 100 g C 100 kg D 1 Tonne E 10 Tonnes

4 What is the difference between the value of the 6 and the 5 in 761253

A 595 B 5950 C 5995 D 59950 E 59995

5 Simplify $7+3(2x-3)$

A $20x-30$ B $8x-12$ C $20x+30$ D $6x+16$ E $6x-2$

6 $\frac{824.3-37.86}{0.813\times4.289}$ is approximately

A 0.2 B 2.0 C 20 D 200 E 2000

7 10 ms^{-1} is approximately the same velocity as:

A 0.002.8 kmh^{-1} B 2.8 kmh^{-1} C 3.6 kmh^{-1} D 36kmh^{-1} E 360kmh^{-1}

8 How many lines of symmetry does a regular hexagon have?

A 1 B 2 C 3 D 6 E 12

9 What is the value of (-3) + 4x(5 - 8)

A 15 B 9 C 6 D (-9) E (-15)

10 There are 240 children in Rosehill School. The pupils come by bus, car, on foot or by another means. A pie chart is drawn to illustrate how they travel to school. 72 of the pupils come by car. How big would the angle representing this be?

A 48° B 60° C 72° D 90° E 108°

Show all your working for the questions on this page -
DO NOT USE YOUR CALCULATOR:

11(a) $23.6 \times 7.802 =$

(b) $918.48 \div 24 =$

(c) $8\frac{3}{5} + 6\frac{11}{15} =$

(d) $8\frac{2}{9} - 4\frac{7}{12} =$

(e) $4\frac{5}{7} \times 2\frac{6}{11} =$

(g) $6\frac{3}{5} \div 8\frac{7}{10} =$

12(a) A football club is planning a trip.
The club hires **234** coaches. Each coach holds **52** passengers.
How many passengers is that altogether?

(b) The club wants to put one first aid kit into each of the 234 coaches.
These first aid kits are sold in **boxes of 18**
How many boxes does the club need?

13 Find the next two terms in each sequence and also the formula for the *n*th term

(a) 4, 7, 10, 13, ..., ... *n*th term: .....

(b) 50, 47, 44, 41, ..., ... *n*th term: .....

(c) $\frac{1}{3}$, $\frac{3}{6}$, $\frac{5}{9}$, $\frac{7}{12}$, ..., ... *n*th term: .....

(d) 2x3, 3x4, 4x5, 5x6, ..., ... *n*th term: .....

(e) 2, 5, 10, 17, ..., ... *n*th term: .....

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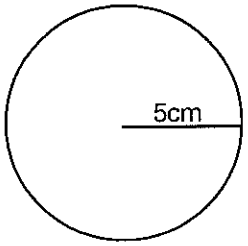
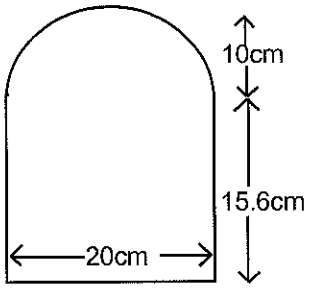
14 Find the perimeter and the area of the following shapes: [*not drawn to scale*]

(a)



(b)



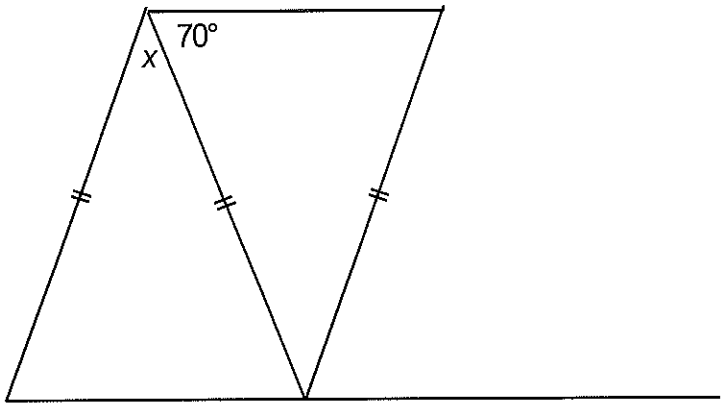
Perimeter = ...

Area = ...

Perimeter = ...

Area = ...

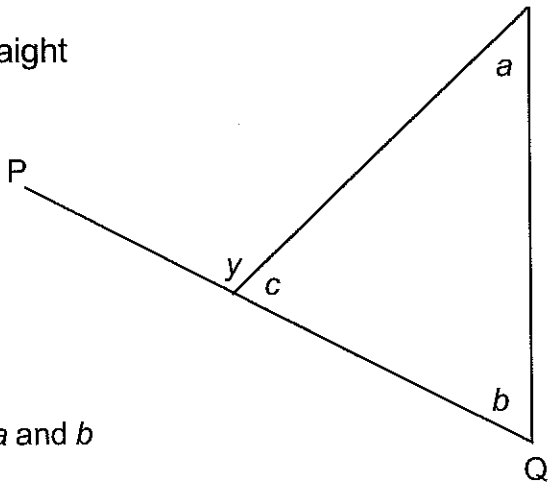
15 The diagram shows two isosceles triangles that make a parallelogram.



(a) On the diagram, mark another angle that is 70°
Label it 70°

(b) Calculate the size of the angle marked x
Show your working.

Now look at the triangle drawn on the straight line PQ



(c) Write an expression for c in terms of y

(d) Now write an expression for c in terms of a and b

(e) Use your answers to parts (c) and (d) to write down and expression for y in terms of a and b

16 A class of 15 pupils scored the following marks in a test:

21, 28, 26, 29, 17, 24, 21, 23, 30, 24, 21, 20, 26, 30, 20

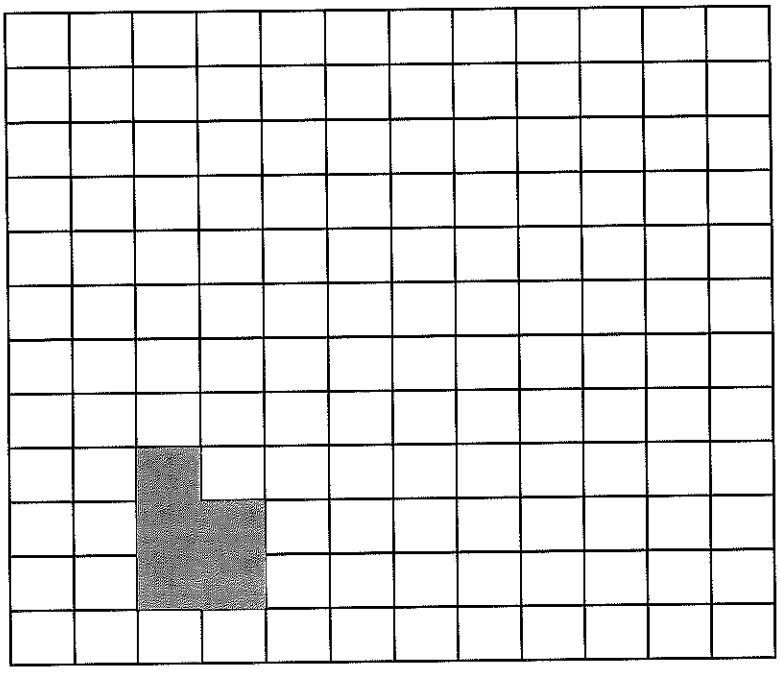
(a) Which score is the mode?

(b) Calculate the mean score?

(c) What is the range of the scores?

(d) If another pupil took the test later because he had been away and he scored 24 marks, would the average have gone up, down or stayed the same? Without any more calculation explain your answer.

17(a)Enlarge the shape by a scale factor of 3



(b) By how many times has the area of the shape increased?

18 Solve the following equations, showing your working:

(a) $5a + 7 = 22$

(b) $13 = 8b - 3$

(c) $4c + 7 = 3$

(d) $3(4 - 5d) = 7$

(e) $7 + 5k = 8k + 1$

(f) $10y - 9 = 4y + 26$

(g) $\frac{g}{3} - \frac{g}{4} = \frac{1}{6}$

(h) $3(x+3) = 6 + 5(7 - x)$

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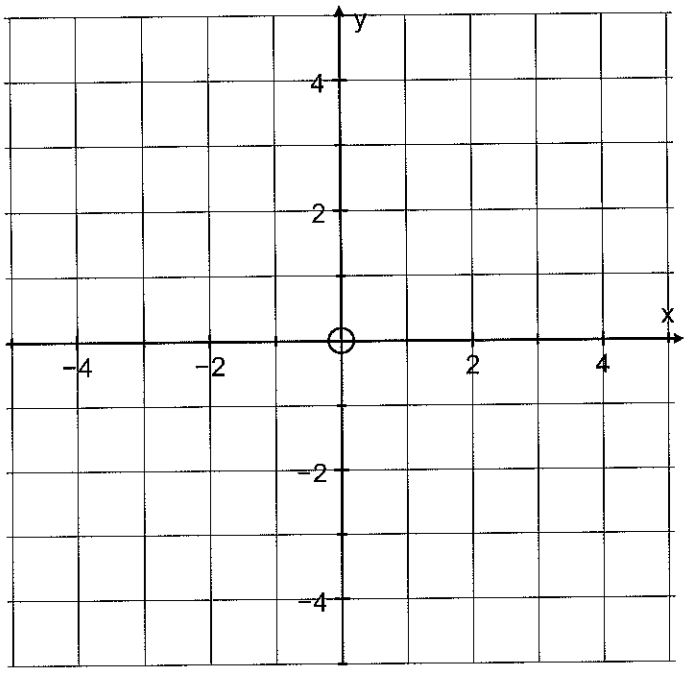
19 a) On the grid below plot the points A(1, 0), B(1, 4), C(-1, 3), D(1, 2) and join them in that order.



b) Rotate the shape by 180° about the origin

c) Reflect the shape in the line $x = 2$

d) What would be the co-ordinates of the points if the shape was reflected in the line $x = 5$?

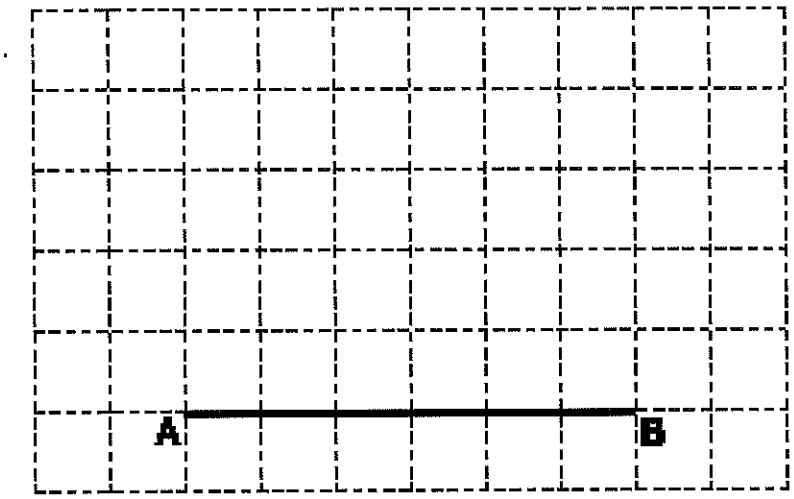
A

B

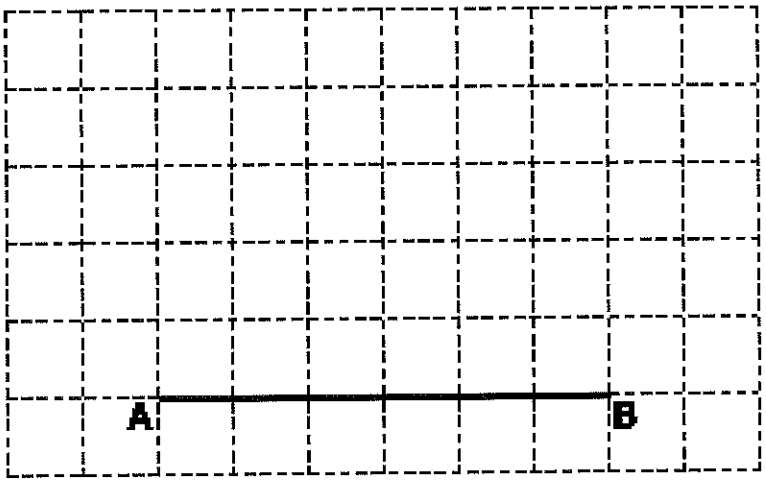
C

D

20 (a) On the cm^2 grid below, draw a **right-angled triangle** with an area of **$12cm^2$**
Use line AB as one side of the triangle.



(b) Now draw an **isosceles triangle** with an area of **$12cm^2$**
Use line AB as one side of the triangle.



21(a) Look at these numbers:

1^6, 2^5, 3^4, 4^3, 5^2, 6^1

Which is the largest?

Which is equal to 2^6?

(b) Circle two of the numbers below that are square numbers?

3^3, 3^4, 3^5, 3^6, 3^7

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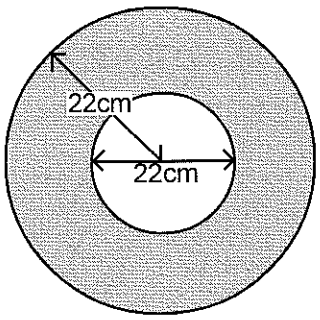
22 Find the shaded area



23(a) Alan has a guessing game on his computer.
He estimates that the probability of **winning** each game is **0.35**

Alan decides to play **20** of these games.
How many of these games should he expect to **win**?

(b) Sue played the same computer game.

She won **12** of the games she played, and so she estimated the probability of winning each game to be **0.4**

How many games did Sue play?
Show your working.

(c) The manufacturers of another guessing game claim that the probability of winning each game is **0.65**

Karen plays this game **200** times and **wins 124** times.

She says: 'The manufacturers must be wrong'.

Do you agree with her? Tick Yes or No.

Yes ☐ No ☐

Explain your answer.

24 How many triangles are there in this shape. (Hint: they do not have to be the same size)