



# ALLEYN'S SCHOOL

## SAMPLE PAPER

### ENTRANCE & SCHOLARSHIP EXAMINATION

For 13+ candidates

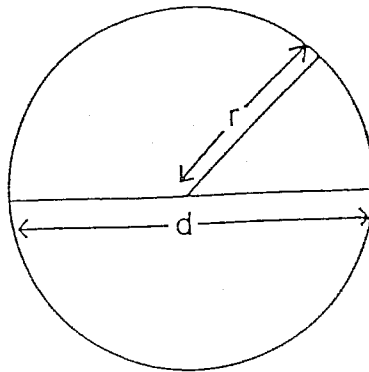
## MATHEMATICS

Time allowed: 1¼ hours

You are expected to use a calculator in this examination. Answer as many questions as you can. If you cannot do a question, leave it and go on to the next question. Show your working, as there may be marks given for working out.

## FORMULAE

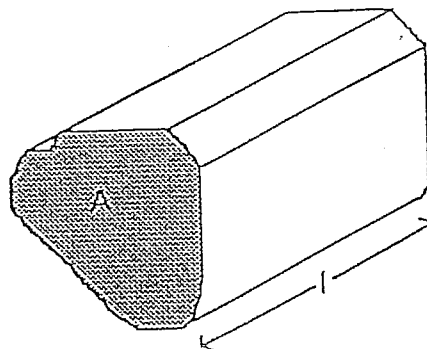
The Circle



$$\text{Area} = \pi r^2$$

$$\text{Circumference} = 2\pi r = \pi d$$

The Prism



$$\text{Volume} = \text{Cross-sectional area} \times \text{length} = A \times l$$

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- 1 A train is timetabled to take 1 hour and 45 minutes to travel from Paddington, London to Bristol Templemead. It leaves Paddington at 10.22 a.m. At what time should it arrive at Bristol?

Answer .....

- 
- 2(a) Find 35% of £10.40

Answer £.....

- (b) Find 140% of 560 grams

Answer .....g

- 
- 3 The number of pages in a magazine was increased from 52 to 65. What will the new price be if the price, which was 60p, is increased in the same ratio as the pages.

Answer .....p.

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4 Solve the following equations:

(a)  $3x + 4 = 19$

Answer  $x = \dots\dots\dots$

(b)  $3(x + 6) = 15$

Answer  $x = \dots\dots\dots$

(c)  $\frac{2x}{5} - 3 = 1$

Answer  $x = \dots\dots\dots$

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5 A theatre sold 480 tickets for a Saturday evening performance.  $x$  of these tickets were for seats in the circle and  $y$  were for seats in the stalls.

(a) Write an equation for the number of tickets sold.

The theatre tickets cost £16 for the circle and £22 for the stalls. The theatre collected £9300 altogether for that Saturday evening performance.

(b) Write an equation for the cost of the tickets.

(c) Solve this pair of simultaneous equations to find the number of circle tickets and the number of stall tickets sold.

Answer: Circle ..... Stalls .....

6 Write down the next two terms and then the  $n^{\text{th}}$  term of each sequence.

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(a) 2, 4, 6, 8, ....., .....  $n^{\text{th}}$  term:

(b)  $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \dots, \dots$   $n^{\text{th}}$  term:

(c) 5, 7, 9, 11, ....., .....  $n^{\text{th}}$  term:

(d) 1, 4, 9, 16, 25, ....., .....  $n^{\text{th}}$  term:

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7 Estimate the answer to  $117 \times 28$

(a) Write down your estimate: .....

(b) Show how you made your estimate:

(c) Now work out the exact answer to  $117 \times 28$  without using a calculator.  
*You must show all your working or you will receive no marks.*

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8 Simplify:

(a)  $2a \times 6a =$

(b)  $2b^2 \times 4b \times a =$

9 Multiply out the brackets:

(a)  $2x(x + 3y + z^2)$

(b)  $4a(a^2 - a)$

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10(a) If  $t = 3a - 10n$  then find  $t$  when  $a = 5$  and  $n = 1$

Answer  $t = \dots\dots\dots$

(b) If  $A = d^2 - 3d + 5$  find  $A$  when

(i)  $d = 4$

Answer  $A = \dots\dots\dots$

(ii)  $d = -2$

Answer  $A = \dots\dots\dots$

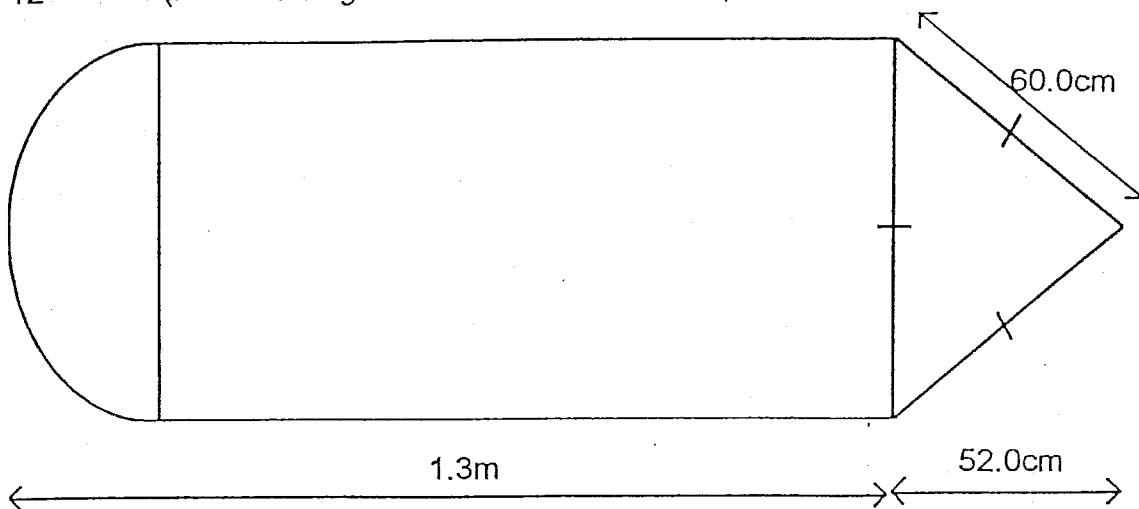
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11 Divide £64 between two sisters in the ration 3 : 5.

Answer  $\dots\dots\dots$

12

(NB This diagram is not drawn to scale)

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The above shape is made up from a semicircle, a rectangle and an equilateral triangle. Find the area of:

(a) The equilateral triangle

Answer .....cm<sup>2</sup>

(b) The semicircle (to 3s.f.)

Answer .....cm<sup>2</sup>

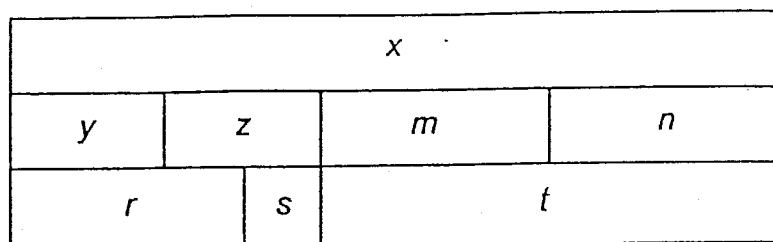
(c) The rectangle

Answer .....cm<sup>2</sup>

(d) The whole shape in m<sup>2</sup> (to 3s.f.)

Answer .....m<sup>2</sup>

13 In the diagram:



$$x = y + z + m + n$$

$$x = r + s + t$$

Complete each of the following by putting a letter in each empty box:

(a)  $t = m +$

(b)  $(y + z) - r =$

(c)  $x - t = y +$

(d)  $x - (y + z) =$    $+$

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14(a) Calculate  $\frac{42167 - 19.21}{(3.74)^2}$

give your answer to 1 d.p.

Answer .....

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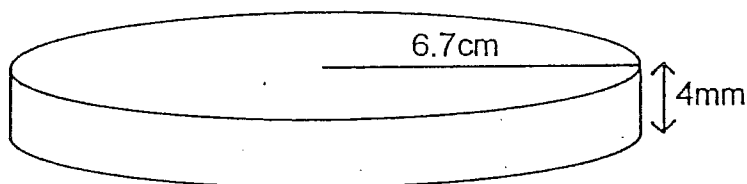
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(b) Calculate  $\sqrt{\frac{14}{21-1.88}}$

give your answer to 1 d.p.

Answer .....

- 15 A cylindrical disc has radius 6.7cm. and thickness 4mm.



Calculate the new volume of the disc after the radius is increased by 20% and the thickness is reduced by 25%. Write your answer to 1 d.p.

Answer .....cm<sup>2</sup>

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- 16 In year 8 of Clifton Hill School there are 120 pupils. Each pupil was asked in their form period whether or not they liked Art and P.E. lessons. Out of the year,  $\frac{1}{20}$  were away on the day of the survey and out of the children who were present  $\frac{2}{3}$  said that they liked P.E. and  $\frac{5}{6}$  said that they liked Art.

(a) How many children missed the survey?

Answer .....

(b) How many pupils **did not like** P.E.?

Answer .....

Out of the pupils who liked P.E. a further  $\frac{3}{4}$  of the pupils said that they liked Art as well.

(c) How many pupils liked both subjects?

Answer .....

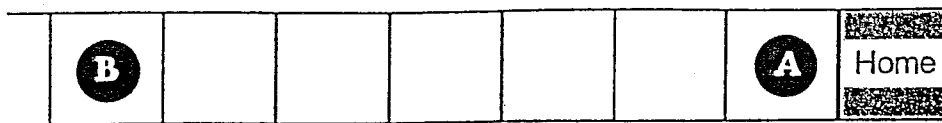
(d) How many pupils disliked both subjects?

Answer .....

- 17 Starting with  $x = 3$  use trial and improvement to find correct to 2 decimal places the value of  $x$  which satisfies:

$$2x^3 + 3x = 112$$

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In a board game, Max has his two counters, A & B, on the spaces shown in the diagram. After a throw of a fair die he moves either A or B, but not both, forward (that is, to the right) the exact number of spaces equal to the score on the die.

(a) State the probabilities that, after one throw of the die:

(i) A could land on "HOME"

Answer .....

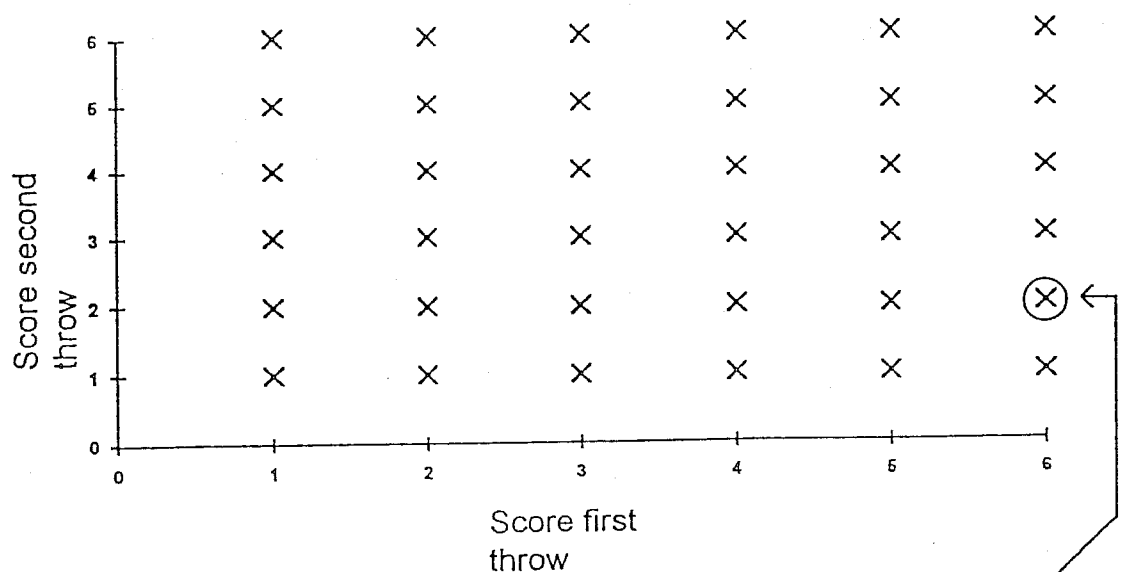
(ii) B could land on "HOME"

Answer .....

(b) Max hopes to get either one of his counters to land on "HOME" after two throws of the die.

Opposite is a possibility space diagram which shows all the combinations possible with two throws of the die

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- (i) Circle all possible combinations of scores on the above diagram which will enable Max to get either of his counters HOME within two throws of the die.
- (ii) Hence find the probability that Max will succeed.

Answer .....