

Name: .....



# **13+ Scholarship Exam**

## **January 2022**

**TIME ALLOWED: 45 minutes**

- Fill in the boxes at the top of this page.
- Try to answer all questions but do not worry if you do not get to the end.
- There are 20 questions and a maximum of 75 marks.
- Calculators are allowed.
- Please write in blue or black ink.
- Marks are shown in square brackets after each question.
- Use a calculator but **SHOW** your calculations because you may lose method marks if you do not.
- You may round your final answers to 3 significant figures unless told otherwise, but do not compromise your accuracy.
- Advice: read each question carefully before you start to answer it and check your answers at the end of the exam if you have time.

[1] (i) Writing down all the figures shown by your calculator, find the value of:

$$\frac{3241}{4.64 + 2.87}$$

Ans: \_\_\_\_\_ (1)

(ii) Write your answer to part (i) correct to 3 significant figures

Ans: \_\_\_\_\_ (1)

(iii) Write your answer to part (i) correct to 2 decimal places

Ans: \_\_\_\_\_ (1)

[2] Where necessary expand then simplify the following:

[a]  $7x - 4y + 4x - 6y$

Ans: \_\_\_\_\_ (2)

[b]  $3(b - 2) + 2(b - 4)$

Ans: \_\_\_\_\_ (2)

[c]  $2(b - 4) - 3(b - 3)$

Ans: \_\_\_\_\_ (2)

[d]  $(x + 4)(x - 6)$

Ans: \_\_\_\_\_ (2)

[3] Factorise the following:

[a]  $2x + 6y$

Ans: \_\_\_\_\_ (2)

[b]  $3x - xy$

Ans: \_\_\_\_\_ (2)

[4] Solve the following:

[a]  $3x - 5 = 16$

Ans:  $x =$  \_\_\_\_\_ (2)

[b]  $3 + 4x = 15 + x$

Ans:  $x =$  \_\_\_\_\_ (2)

[c]  $2(6 - x) + 4(x + 2) = 34$

Ans:  $x =$  \_\_\_\_\_ (3)

[d]  $2p^2 + 7 = 79$

Ans:  $p =$  \_\_\_\_\_ (2)

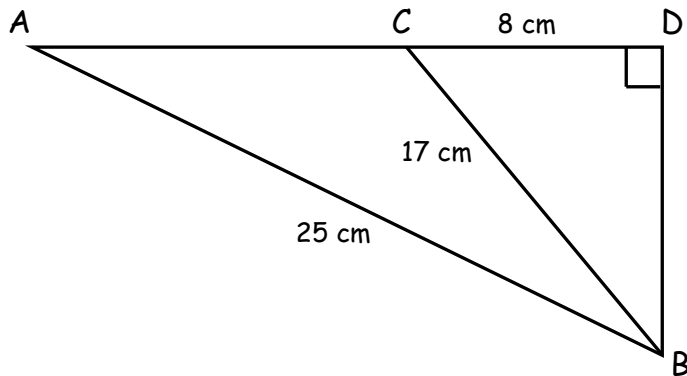
[e]  $\frac{x}{4} - \frac{x}{5} = 6$

Ans:  $x =$  \_\_\_\_\_ (2)

- [5] In a sale the price of a mobile phone is reduced by 35%.  
If its normal price is £240, calculate its sale price.

Ans: £\_\_\_\_\_ (2)

- [6] In the diagram BDA is a right angle. The lengths of AB, BC and CD are shown.



- (i) Calculate the length of BD

Ans: BD = \_\_\_\_\_ (2)

- (ii) Hence calculate the length of AC

Ans: AC = \_\_\_\_\_ (2)

- [7] Express 32 as a percentage of 40

Ans: \_\_\_\_\_% (2)

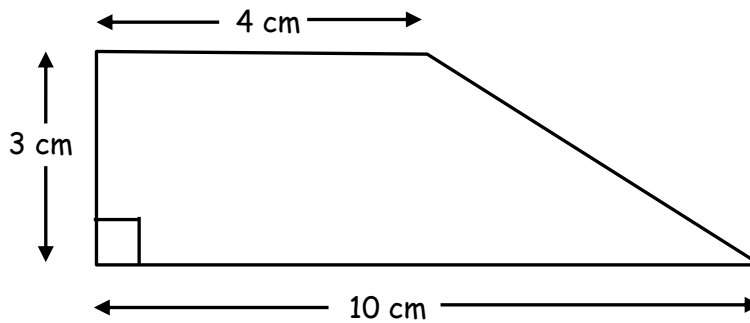
- [8] 30% of a number is 36. What is the number?

Ans: \_\_\_\_\_ (2)

- [9] It was reported this month that the average house price in Glasgow had dropped by 2% in the last month.  
If the average house price is now £220 500, calculate the average house price last month.

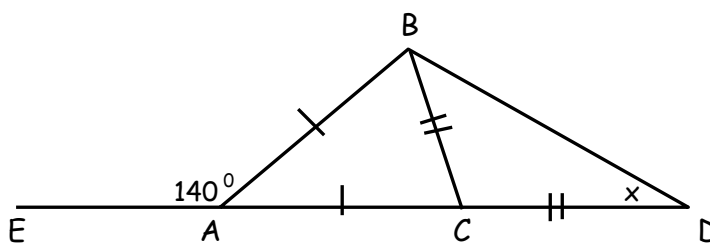
Ans: £\_\_\_\_\_ (2)

- [10] Find the area of the quadrilateral in the diagram below.



Ans: \_\_\_\_\_  $\text{cm}^2$  (3)

- [11] In the diagram below  $BC = CD$  and  $AB = AC$ . Angle  $EAB = 140^\circ$   
Calculate the size of angle  $BDC$  marked  $x$  in the diagram.



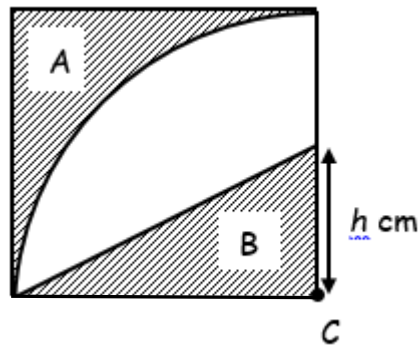
Ans: \_\_\_\_\_  $^\circ$  (2)

- [12] The mean weight of 6 ballet dancers is 55 kg.  
The mean weight of 10 rugby players is 100 kg.  
Calculate the mean weight of all 16 people.

Ans: \_\_\_\_\_ kg (3)

[13] The diagram below shows a square of 6 cm. The curved line forms part of a circle of radius 6 cm and centre at point C.

[diagrams are not drawn to scale]



- (a) Calculate the area of the shaded region A, giving your answer corrected to 2 decimal places.

Ans: \_\_\_\_\_ (2)

- (b) Write down the area of the shaded region B in terms of the length  $h$  cm.

Ans: \_\_\_\_\_  $\text{cm}^2$  (2)

- (c) If the two shaded regions, A and B, are equal in area, calculate  $h$ , giving your answer correct to 2 decimal places.

Ans: \_\_\_\_\_ cm(2)

- [14] The diagram below shows a 'magic square' in which all rows, columns and diagonals have the same total.

16	$N - 2$	$N + 3$
$N$	$N + 2$	$N + 4$
12	$N + 6$	$N - 1$

Form an equation from the information given and find the value of the centre box.

Ans: \_\_\_\_\_ (3)

- [15] You are given that:

$$a + b - c = -6$$

$$b + c - a = 22$$

$$c + a - b = 20$$

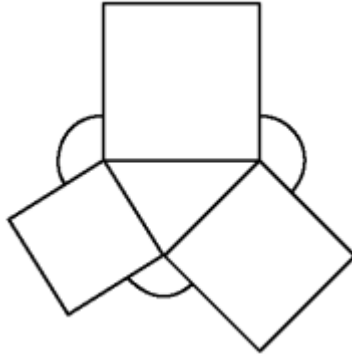
Find the value of  $a + b + c$

Ans:  $a + b + c =$  \_\_\_\_\_ (4)

- [16] The number  $3^4 \times 4^5 \times 5^6$  is written out in full. How many zeros are there at the end of the number?

Ans: \_\_\_\_\_ (2)

- [17] The diagram shows three squares drawn on the sides of a triangle. What is the sum of the three marked angles?



Ans: Sum = \_\_\_\_\_ (2)

- [18] The pattern 123451234512345 ... is continued to form a 2000-digit number. What is the sum of all 2000 digits?

Ans: Sum = \_\_\_\_\_ (2)

- [19] The three circles shown have the same centre and have radii 2 cm, 4 cm and 6 cm. What fraction of the circle is shaded?



Ans: \_\_\_\_\_ (3)



[20] Here is a new way of combining two whole numbers:

$a \odot b$  = the remainder when  $a \times b$  is divided by 12

For example,

$5 \odot 11$  = the remainder when  $5 \times 11$  is divided by 12

= the remainder when 55 is divided by 12

= 7

(a) Calculate  $4 \odot 8$

Ans: \_\_\_\_\_ (2)

(b) Calculate  $(14 \odot 5) \odot 3$

Ans: \_\_\_\_\_ (2)

(c) Find the smallest positive whole number such that  $11 \odot x = 5$

Ans: \_\_\_\_\_ (3)

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MAXIMUM MARKS FOR THE EXAM : 75

END OF EXAM