

# **Mathematics Entrance Exam 2021**

## **FINAL VERSION MARK SCHEME**

You may not use a calculator to answer any questions in this test.

Section A: Write the answer to each question in the answer box. You may use the grid for your working out. There are a total of 12 marks available in this section.

1.

$378 - 196 =$																			
																		<b>182</b>	

1 mark

2.

$879 + 268 =$																			
																		<b>1147</b>	

1 mark

3.

$$345 \times 4 =$$

**1380**

1 mark

4.

$$4206 \div 3 =$$

**1402**

1 mark

5.

$$16.2 + 9.8 =$$

**26 or 26.0**

1 mark

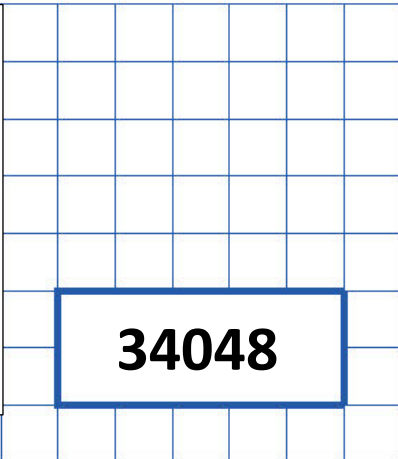
6.

$$\frac{2}{3} \text{ of } \pounds 729 =$$

**486**

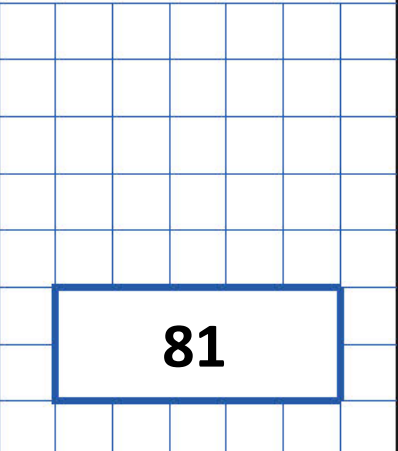
1 mark

7.

608 x 56 =	
3648 M1 for either seen	
<u>30400</u> M1 for either seen	
34048 A1 CAO	
<b>34048</b>	

2 marks

8.

45% of 180	
10% x 180=18 M1	
5% x 180 = 9 or M1	
20% x 180= 36 or M1	
40% x 180=72 M1	
Other multiples of 10% M1	
<b>81</b>	

2 marks

9.

$$15 \div \frac{1}{7} =$$

**105**

1 mark

10.

$$6 \times 9 \times 12 =$$

**648**

1 mark

**Section B: For these questions, show your working in the space provided.**

1. 96 pupils and teachers go by minibus to the sports tournament.

How many 15-seater minibuses will be required?

**7** minibuses

1 mark

2. Fill in the missing numbers in the following sequences.

1, 4, **7**, 10, 13

0.1, 0.25, 0.4, **0.55**, 0.7

9, 5, 1, **-3**, -7

3 marks

3. Complete the number sentences using these cards.

$\times 10$	$\times 100$	$\times 1000$
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$\div 10$	$\div 100$	$\div 1000$
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$$36.55 \quad \boxed{\mathbf{X 10}} \quad = 365.5$$

$$0.2 \quad \boxed{\div 100} \quad = 0.002$$

$$7800 \quad \boxed{\div 1000} \quad = 7.8$$

$$47.3 \quad \boxed{\mathbf{X 100}} \quad = 4730$$

2 marks

Award **ONE** mark for any two sentences correct.

4. Megan makes a sequence of numbers starting with **100**

She **subtracts 45** each time.

Write the next **two** numbers in the sequence.

100    55    10    **-35**    **-80**

2 marks

(a) **-35** (in left-hand box)

*Accept for **ONE** mark '35-' AND '80-'*

1

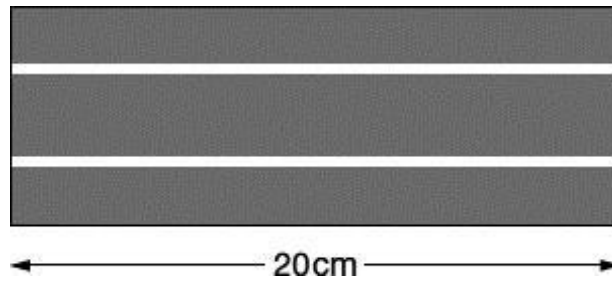
(b) **-80** (in right-hand box)

*Accept for **ONE** mark any two **negative** numbers such that the second is 45 less than the first.*

1



5. (a) A straight piece of model car track is 20cm in length.

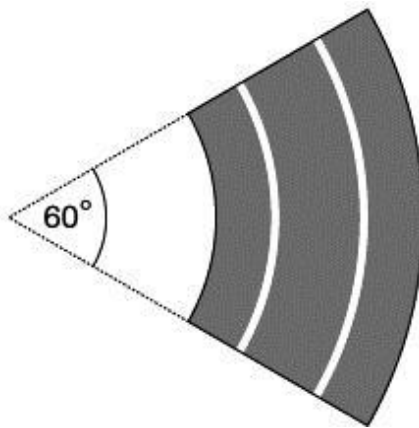


How many of these straight pieces are needed to make a **1.8 metre** track?

9

1 mark

- (b) A curved piece of track looks like this:

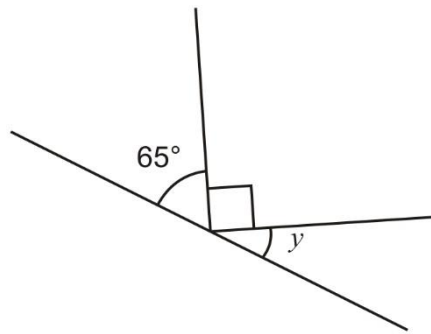


How many of these curved pieces are needed to make a **complete circle** of track?

6

1 mark

6.



Not to scale

Calculate the size of angle  $y$  in this diagram.

Do **not** use a protractor (angle measurer).


25°

1 mark

7.


### Brackets

(a) Work out the answer.

  $2 + (16 \div 2) + 6 = \dots\dots 16 \dots\dots$

1 mark

(b) Put brackets in the calculation below to make it correct.

  $2 + 16 \div (2 + 6) = 4$

1 mark

8. This is a list of the highest temperatures each day for one week.

Day	Temperature
Sunday	- 2°C
Monday	- 1°C
Tuesday	8°C
Wednesday	12°C
Thursday	13°C
Friday	11°C
Saturday	7°C

- a) How many degrees warmer was it on the hottest day than on the coldest day?

**degrees between -2 to 13**

**15 °C**

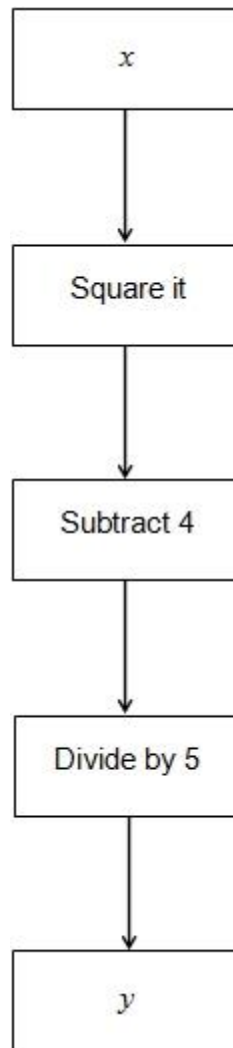
**1 mark**

- b) The temperature **falls** from 7°C on Saturday by 10°C. What is the new temperature?

**-3 °C**

**1 mark**

9. The number machine shows how to find  $y$  when you know  $x$ .

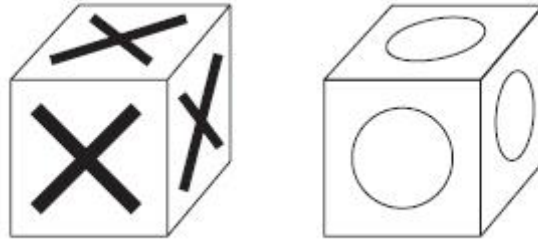


Work out the value of  $y$  when  $x = 8$

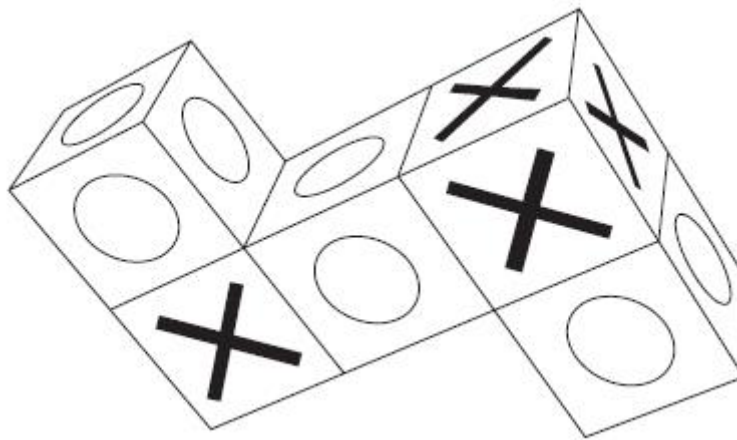
$y =$    **12**  

**1 mark**

10. Asif has some cubes with a cross on each face and some cubes with a circle on each face.



He sticks five cubes together to make this shape.



How many crosses and how many circles are there on the **outside** of the shape?

Number of crosses


8

1 mark

11. (a) I think of a number.

I **double** my number and the answer is **178**

What is my number?

 ..... **89** .....


1 mark

(b) I think of a different number.

I **double** my number, then I **double again**.

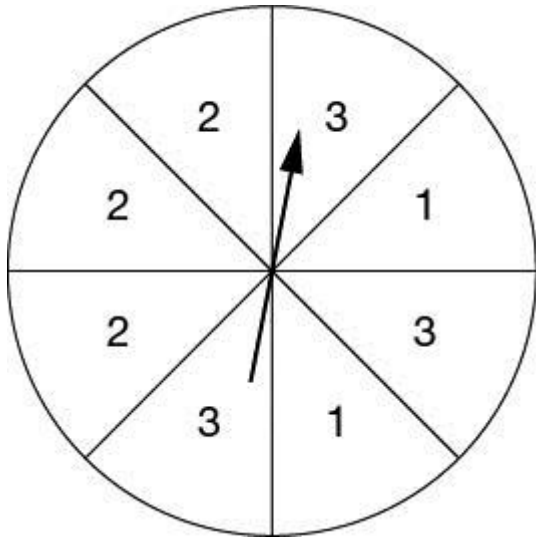
The answer is **312**

What is my number?

 ..... **78** .....

1 mark

12. Here is a fair spinner divided into 8 equal sections.



I am going to spin the pointer.

For each statement below, tick (✓) True or False.



True    False

I am **equally likely** to spin a 2 as to spin a 3

X	
---	--

I am **more likely** to spin an even number than an odd number.

	X
--	---

It is **impossible** that I will spin a number less than 2

	X
--	---

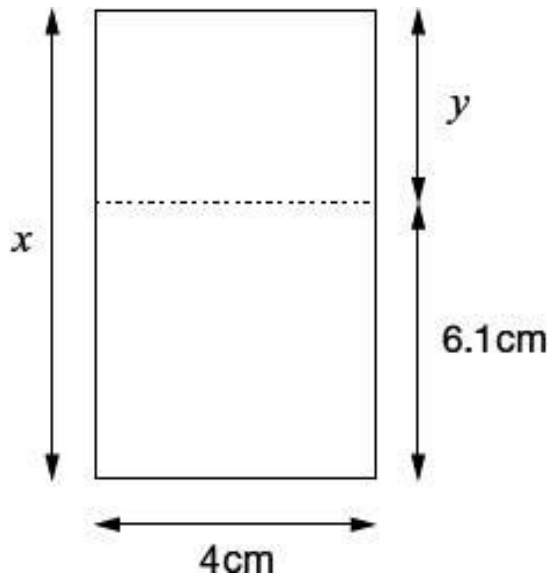
It is **certain** that I will spin a number less than 4

X	
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**A1 for any 3 correct answers**

**2 marks**

13. Look at the rectangle.



Not drawn accurately

The **total area** of the rectangle is **40cm<sup>2</sup>**

Work out lengths  $x$  and  $y$

*Handwritten mark*

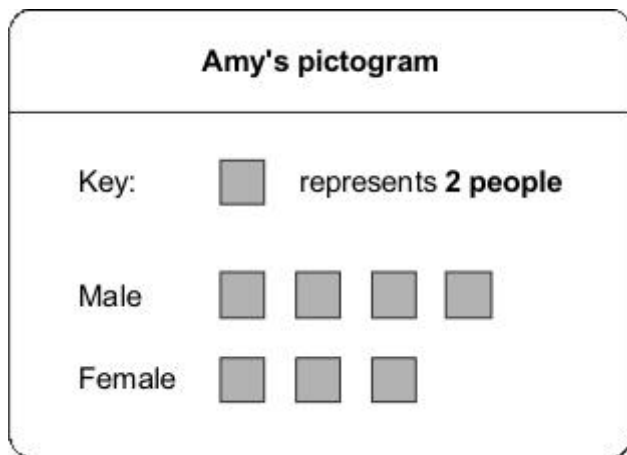
$$x = \dots\dots\dots \mathbf{10} \dots\dots\dots \text{cm} \quad y = \dots\dots\dots \mathbf{3.9} \dots\dots\dots \text{cm}$$

**2 marks CAO**



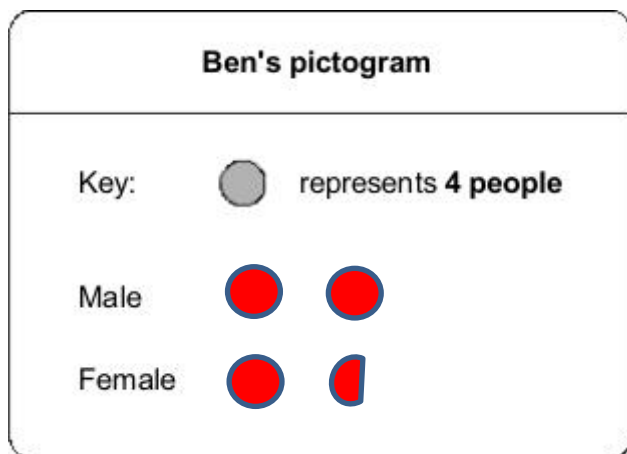
14. Amy and Ben do a survey together.

They each draw a pictogram.



Ben shows the **same** information but uses a **different key**.

Complete Ben's pictogram.




2 marks

15. I am thinking of two numbers.

When I **add** my numbers, the answer is **1**

When I **multiply** my numbers, the answer is **0.09**

What are my numbers?

 ..... **0.1** ..... and ..... **0.9** .....

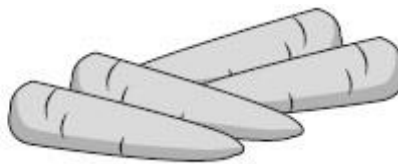
1 mark for both values in any order

16.



potatoes

£1.50 per kg



carrots

£1.80 per kg

Jack buys  $1\frac{1}{2}$  kg of potatoes and  $\frac{1}{2}$  kg of carrots.

How much **change** does he get from **£5**?

**£1.50 + £0.75 + £0.90 M1 calculation seen or M1 2 out of 3 values seen.**

**£3.15**

 ..... **£1.85** .....

2 marks

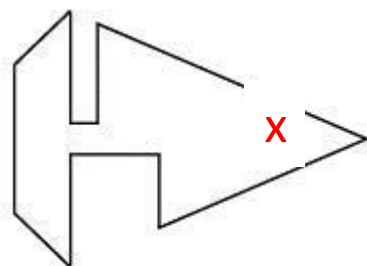
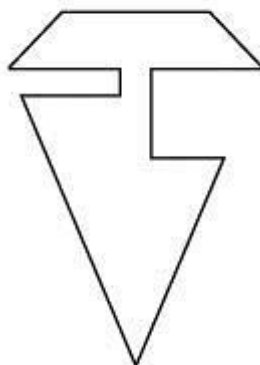
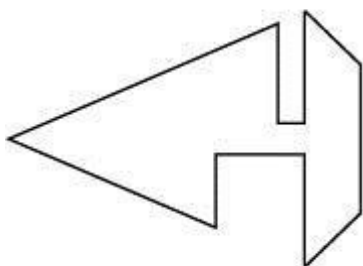
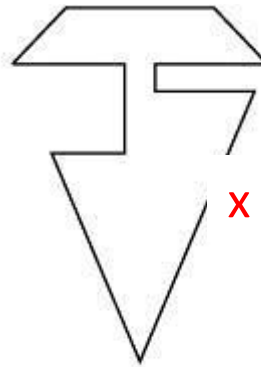
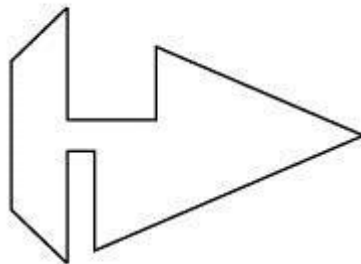
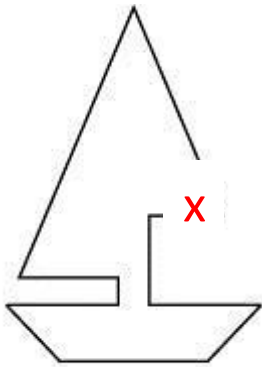
17. Samir has a piece of card that is grey on one side and white on the other.

He cuts out this shape from the card.



He turns over the shape so that the white side is showing.

Tick (✓) **all** the shapes below that show the **white** side of Samir's shape.



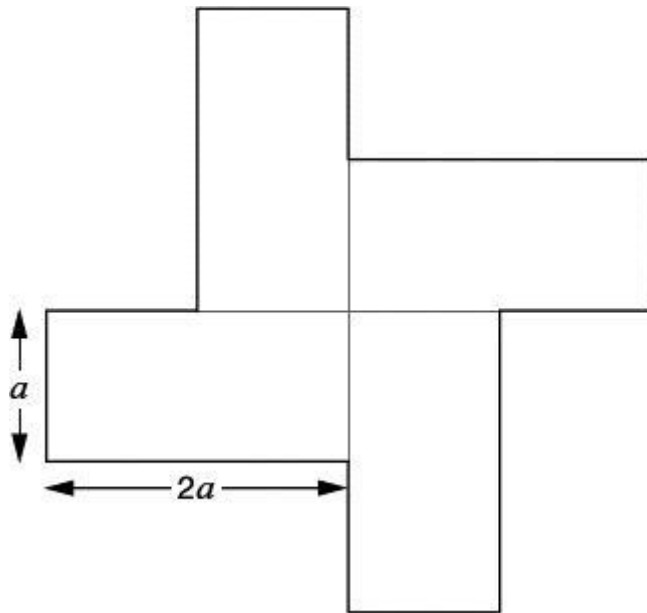
M1 Indicates any two of the correct shapes with the third incorrect or omitted

Or M1 Indicates the three correct shapes **plus** not more than one other incorrect

2 marks

18. This shape is made of four congruent rectangles.

Each rectangle has side lengths  $2a$  and  $a$



Not drawn accurately

The **perimeter** of the shape is **80cm**.

Work out the **area** of the shape.

perimeter =  $16a$

$$16a = 80$$

$$a = 5$$

$$\text{area one rectangle} = 5 \times (2 \times 5) = 50\text{cm}^2$$

$$\text{area of shape} = 4 \times \text{area one rectangle} = 4 \times 50 = 200\text{cm}^2$$

M1 if  $a=5$  seen or

M1 if area of one rectangle calculated as 50

.....**200**.....  $\text{cm}^2$

**2 marks**

19. A bag contains coloured beads.

The table shows numbers and fractions of each colour.

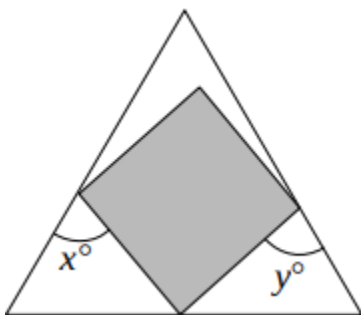
Write the missing numbers and fractions in the table.

Colour	Number of beads	Fraction
Blue	12	$\frac{6}{12} = \frac{1}{2}$
Red	2	$\frac{1}{12}$
Green	4	$\frac{2}{12} = \frac{1}{6}$
Other	6	$\frac{1}{4}$

M1 for sight of 8/12 or 24 beads in total

2 marks

20. The diagram shows a square inside an equilateral triangle. What is the value of  $x + y$ ?



90 degrees or 60 degrees seen - M1

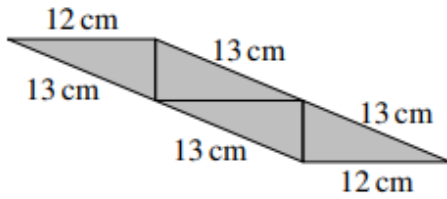
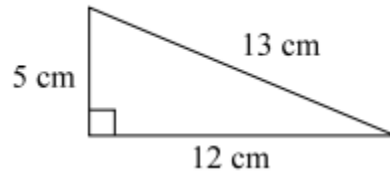
An equation involving sum to 180 degrees seen - M1

$x + y = 150$  A1

$x + y = \dots\dots 150 \dots\dots \text{°}$

2 marks

21. Four copies of the triangle shown are joined together, without gaps or overlaps, to make a parallelogram. What is the largest possible perimeter of the parallelogram?



1 mark for correct diagram

1 mark for correct answer of 76

Perimeter = .....**76**.....cm

2 marks

**END OF TEST**

**Total 50 Marks**