

Surname <i>StemUp Model Solution</i>	Centre Number	Candidate Number
Other Names		0



GCSE

3300U20-1



MATHEMATICS
UNIT 2: CALCULATOR-ALLOWED
FOUNDATION TIER

THURSDAY, 6 JUNE 2019 – MORNING

1 hour 30 minutes

ADDITIONAL MATERIALS

A calculator will be required for this examination.
A ruler, protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.
You may use a pencil for graphs and diagrams only.
Write your name, centre number and candidate number in the spaces at the top of this page.
Answer **all** the questions in the spaces provided.
If you run out of space, use the additional page at the back of the booklet. Question numbers must be given for all work written on the additional page.
Take π as 3.14 or use the π button on your calculator.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.
Unless stated, diagrams are not drawn to scale.
Scale drawing solutions will not be acceptable where you are asked to calculate.
The number of marks is given in brackets at the end of each question or part-question.
In question 9, the assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing.

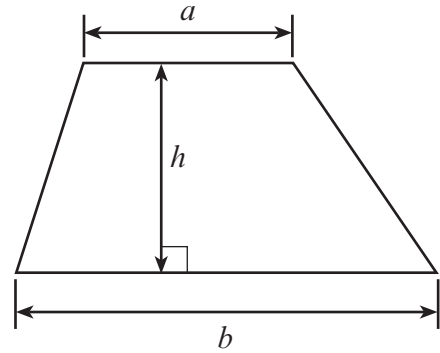
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	4	
2.	3	
3.	3	
4.	2	
5.	3	
6.	2	
7.	4	
8.	4	
9.	5	
10.	4	
11.	3	
12.	5	
13.	4	
14.	5	
15.	5	
16.	5	
17.	4	
Total	65	



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Formula List - Foundation Tier

Area of trapezium $= \frac{1}{2} (a + b)h$



1. Fill in the boxes below to make each calculation correct.

[4]

$$\boxed{9\text{p}} + \boxed{£4.58} = \boxed{£4.67\ldots}$$

$$\boxed{43\text{p}} + \boxed{£5.84\ldots} = \boxed{£6.27}$$

$$\boxed{12} \times \boxed{59\text{p}} = \boxed{£7.08\ldots}$$

$$\boxed{19} \times \boxed{£1.45\ldots} = \boxed{£27.55}$$

Space for working:

$$£4.58 + £0.09 = £4.67$$

$$£6.27 - £0.43 = £5.84$$

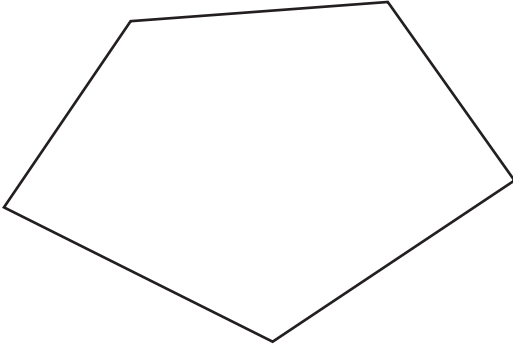
$$12 \times £0.59 = £7.08$$

$$£27.55 \div 19 = £1.45$$



2. Write down the special name of each of the following.

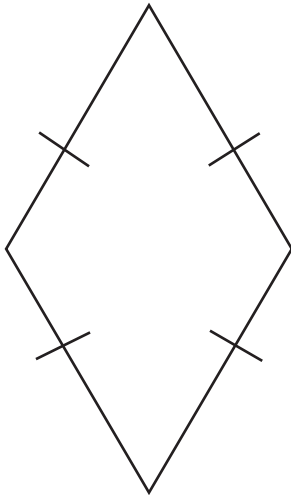
(a)



Pentagon

[1]

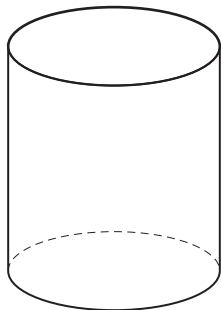
(b)



Rhombus

[1]

(c)



Cylinder

[1]



3. (a) Write down the first 3 multiples of 47.

[1]

$$47 \times 1 = 47, \quad 47 \times 2 = 94, \quad 47 \times 3 = 141$$

47, 94, 141

- (b) One of the numbers below is a factor of 676.
Circle the correct number.

[1]

22

32

42

52

62

$$676 \div 52 = 13 \text{ exactly, so } 52 \text{ is a factor of } 676$$

- (c) When one of the numbers below is divided by 22, there is a remainder of 11.
Circle the correct number.

[1]

208

209

210

211

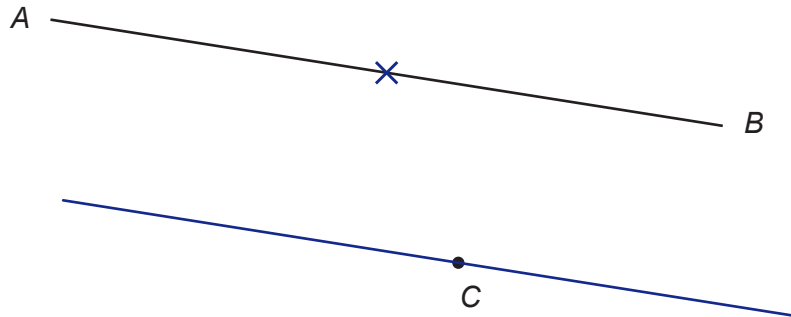
212

$$22 \times 9 = 198$$

$$209 - 198 = 11, \text{ so } 209 \div 22 = 9 \text{ remainder } 11$$



4. A line AB is shown below.



- (a) Mark the midpoint of AB with a $\times$. [1]

- (b) Draw a line parallel to AB that passes through point C . [1]

5. (a) Bethan writes down two square numbers.

She adds her two numbers together.
Her answer is a square number less than 30.

Which two square numbers did Bethan write down? [2]

Square numbers: 1, 4, 9, 16, 25

$9 + 16 = 25$

25 is a square number and $25 < 30$

Bethan's square numbers are*9*..... and*16*.....

- (b) Harri adds three even numbers together and gets an answer of 23.

Explain how you know that Harri's answer is incorrect. [1]

Even + even = even, so three even numbers always add up

to an even number. 23 is odd, so Harri is incorrect.



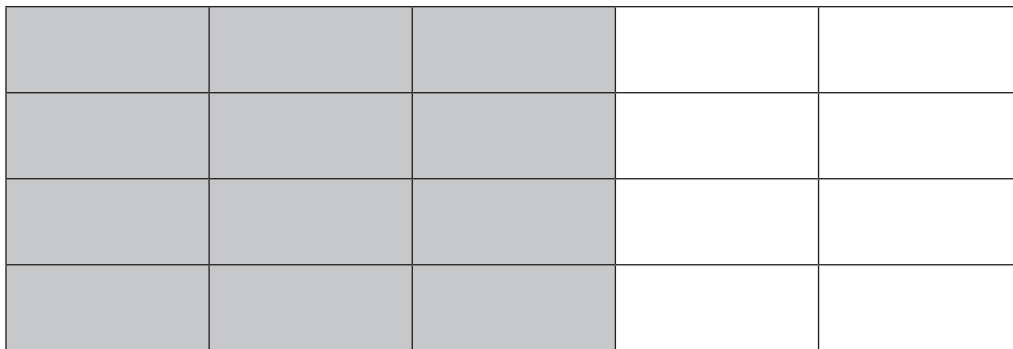
6. Circle either TRUE or FALSE for each statement given below.

[2]

STATEMENT		
The length of the diameter of a circle is equal to half the length of its radius.	TRUE	<u>FALSE</u>
A straight line connecting two points on the perimeter of a circle is a chord.	<u>TRUE</u>	FALSE
The circumference is the special name for the space inside a circle.	TRUE	<u>FALSE</u>
Two circles, each with radius 5 cm, must be congruent.	<u>TRUE</u>	FALSE

7. (a) What percentage of the following shape is shaded?

[2]



12 squares shaded out of 20, so $12/20 = 0.6$

$12 \div 20 \times 100 = 0.6 \times 100 = 60\%$

60 %

- (b) You are given the value of 25% of a number.
Explain how you can find the value of the number.

[1]

Multiply the value of 25% by 4,

because $25\% \times 4 = 100\%$ (the whole number).

- (c) Explain how you know that $\frac{1}{8}$ is greater than $\frac{1}{10}$.

[1]

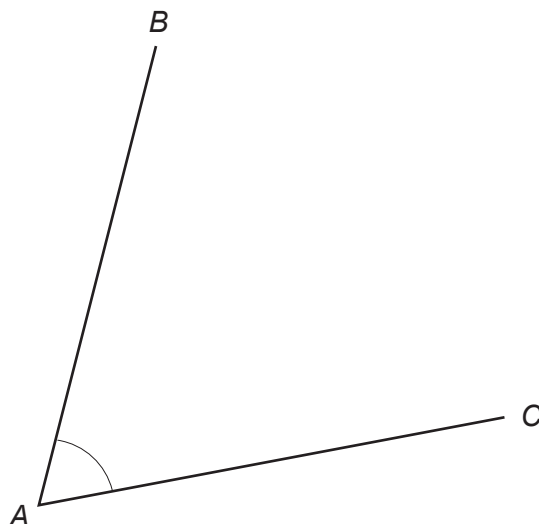
$1 \div 8 = 0.125$ and $1 \div 10 = 0.1$

0.125 is greater than 0.1, so one eighth is greater than one tenth.



8. (a) Measure $\hat{BAC}$.

[1]



$$\hat{BAC} = \text{.....} 65 \text{.....}^\circ$$

- (b) One of the angles below is a reflex angle.
Circle the correct answer.

[1]

45°

90°

135°

180°

225°

- (c) The diagram below shows two angles on a straight line.
The large angle is 5 times the size of the small angle.
Find the size of each angle.

[2]



Diagram not drawn to scale

Angles on a straight line add up to 180°

$$\text{small} + 5 \times \text{small} = 6 \times \text{small} = 180^\circ$$

$$\text{Small angle} = 180 \div 6 = 30^\circ$$

$$\text{Large angle} = 5 \times 30 = 150^\circ$$

$$\text{Check: } 30^\circ + 150^\circ = 180^\circ$$

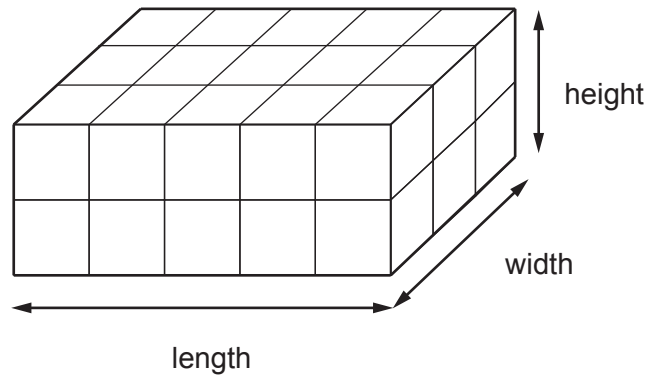
$$\text{Small angle} = \text{.....} 30 \text{.....}^\circ$$

$$\text{Large angle} = \text{.....} 150 \text{.....}^\circ$$



9. In this question, you will be assessed on the quality of your organisation, communication and accuracy in writing.

Cuboid A is made up of a number of cubes as shown below.
Each edge of each cube is 1 cm long.



A different cuboid, Cuboid B, has the same length and width as Cuboid A.
The height of Cuboid B is three times the height of Cuboid A.

What is the volume of Cuboid B?
You must show all your working.

[3 + 2 OCW]

Cuboid A: length = 5 cm, width = 3 cm, height = 2 cm

Cuboid B has the same length and width as Cuboid A.

Height of Cuboid B = $3 \times 2 = 6$ cm

So Cuboid B measures 5 cm by 3 cm by 6 cm.

Volume of a cuboid = length $\times$ width $\times$ height

Volume of Cuboid B = $5 \times 3 \times 6$

$$= 15 \times 6$$

$$= 90 \text{ cm}^3$$

The volume of Cuboid B is 90 cm^3 .



10. (a) Describe **in words** the rule for continuing each of the following sequences.

(i) 38, 32, 26, 20, ...

[1]

Rule:

Subtract 6 from the previous term.

(ii) $\frac{1}{4}$, $\frac{1}{2}$, 1, 2, ...

[1]

Rule:

Double the previous term (multiply it by 2).

(b) (i) Adam has x marbles. His friend gives him 3 more.
Write down, in terms of x , the total number of marbles Adam now has.

[1]

$x + 3$

(ii) Petrol costs $\text{£}g$ per litre.
Write down, in terms of g , the cost of 15 litres of petrol.

[1]

$\text{£}15g$



11. Calculate each of the following.

(a) $4.8^2 + \sqrt{28.09}$

[2]

$$4.8^2 = 23.04 \quad \sqrt{28.09} = 5.3$$

$$23.04 + 5.3$$

$$= 28.34$$

(b) $\frac{4}{9}$ of 78.3

[1]

$$78.3 \div 9 \times 4 = 8.7 \times 4$$

$$= 34.8$$



12. (a) Find the value of $5f + 7g$ when $f = 3.8$ and $g = -2.6$. [2]

$$5 \times 3.8 + 7 \times (-2.6)$$

$$= 19 + (-18.2)$$

$$= 19 - 18.2$$

$$= 0.8$$

- (b) Solve the following equation.
Give your answer correct to 1 decimal place. [3]

$$7x - 4 = 12$$

$$7x - 4 = 12$$

$$7x = 12 + 4$$

$$7x = 16$$

$$x = 16 \div 7$$

$$x = 2.285714286...$$

$$x = 2.3 \text{ (to 1 d.p.)}$$



13. (a) Circle the longest time period from the list given below.

[1]

180 minutes 4.5 hours 4 hours 45 minutes $4\frac{1}{4}$ hours $\frac{1}{6}$ th of a day

180 minutes = 3 h, 4.5 hours = 4 h 30 min,

$4\frac{1}{4}$ hours = 4 h 15 min, $\frac{1}{6}$ of 24 h = $24 \div 6 = 4$ h

Longest is 4 hours 45 minutes

- (b) Circle the longest distance from the list given below.

[1]

30 000 mm 250 m 2 km 70 m 4 000 cm 2.4 km

30 000 mm = 30 m, 250 m, 2 km 70 m = 2 070 m,

4 000 cm = 40 m, 2.4 km = 2 400 m

Longest is 2.4 km

- (c) Circle either TRUE or FALSE for each statement given below.

[2]

STATEMENT		
7 kilometres is less than 5 miles	TRUE	FALSE
1 kilogram is less than 2 pounds (lb)	TRUE	FALSE
1 litre is less than 1 pint	TRUE	FALSE
8 litres is less than 900 cm^3	TRUE	FALSE

5 miles $\approx$ 8 km, so 7 km < 5 miles. 1 kg $\approx$ 2.2 lb (less than 2 lb is false)

1 litre $\approx$ 1.75 pints, so 1 litre is more than 1 pint

8 litres = 8000 cm^3 , which is more than 900 cm^3



14. Catrin makes the following statement.

If you double the length of each side of a rectangle, you will double its perimeter and also double its area.

Is Catrin correct?

Show clearly, using an example, how you came to your decision.

[5]

Example: Rectangle 1 is 4 cm by 3 cm.

$$\text{Perimeter} = 4 + 3 + 4 + 3 = 14 \text{ cm}$$

$$\text{Area} = 4 \times 3 = 12 \text{ cm}^2$$

Double each side: Rectangle 2 is 8 cm by 6 cm.

$$\text{Perimeter} = 8 + 6 + 8 + 6 = 28 \text{ cm}$$

$$\text{Area} = 8 \times 6 = 48 \text{ cm}^2$$

Perimeter: $28 = 2 \times 14$, so the perimeter has doubled.

Area: $48 = 4 \times 12$, so the area is 4 times as big.

Double the area would be 24 cm^2 , not 48 cm^2 .

Catrin is not correct. Doubling each side doubles the perimeter, but the area does not double (it is 4 times as big).



15. 18% of £256 is shared in the ratio 2 : 1.
Calculate the value of the larger share.
Give your answer to the nearest 10p.

You must show all your working.

[5]

$$18\% \text{ of } £256 = 0.18 \times 256 = £46.08$$

$$\text{Ratio } 2 : 1, \text{ so total parts} = 2 + 1 = 3$$

$$\text{One part} = £46.08 \div 3 = £15.36$$

$$\text{Larger share} = 2 \times £15.36 = £30.72$$

$$= £30.70 \text{ (to the nearest 10p)}$$

The larger share is £30.70.



16. (a) The diagram shows two congruent triangles. The coordinates of each vertex are shown.

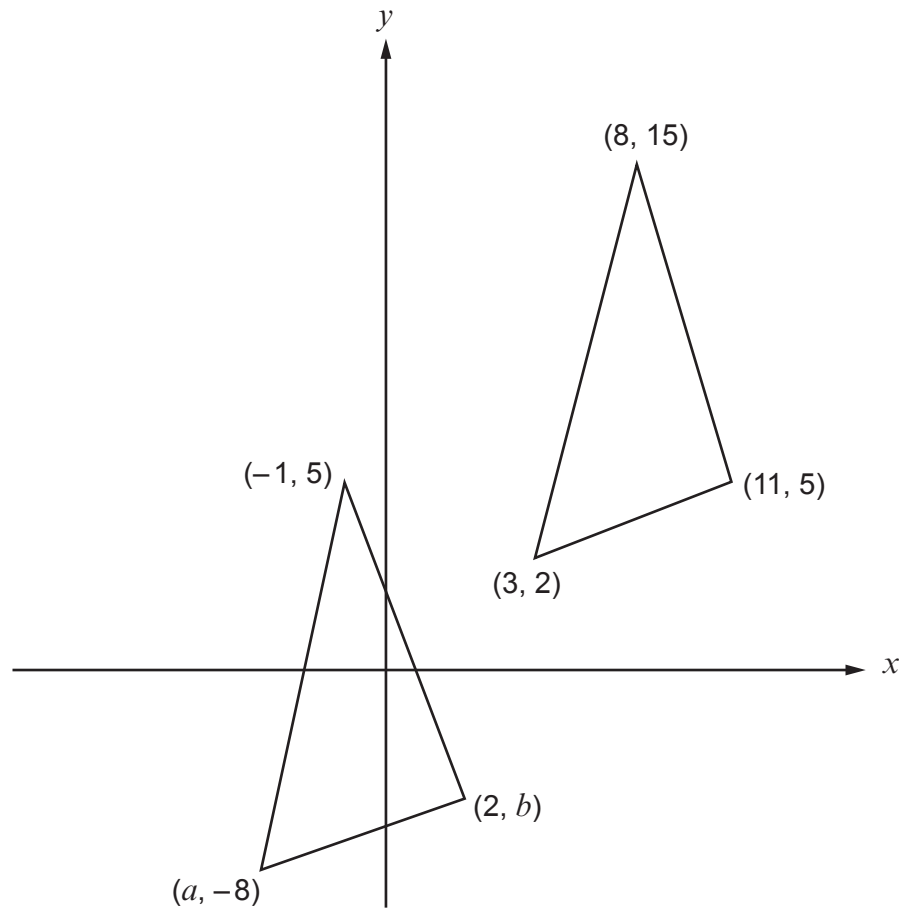


Diagram not drawn to scale

Find the value of a and the value of b .

[2]

$(8, 15) \rightarrow (-1, 5)$: 9 left and 10 down

$(11, 5) \rightarrow (11 - 9, 5 - 10) = (2, -5)$, so $b = -5$

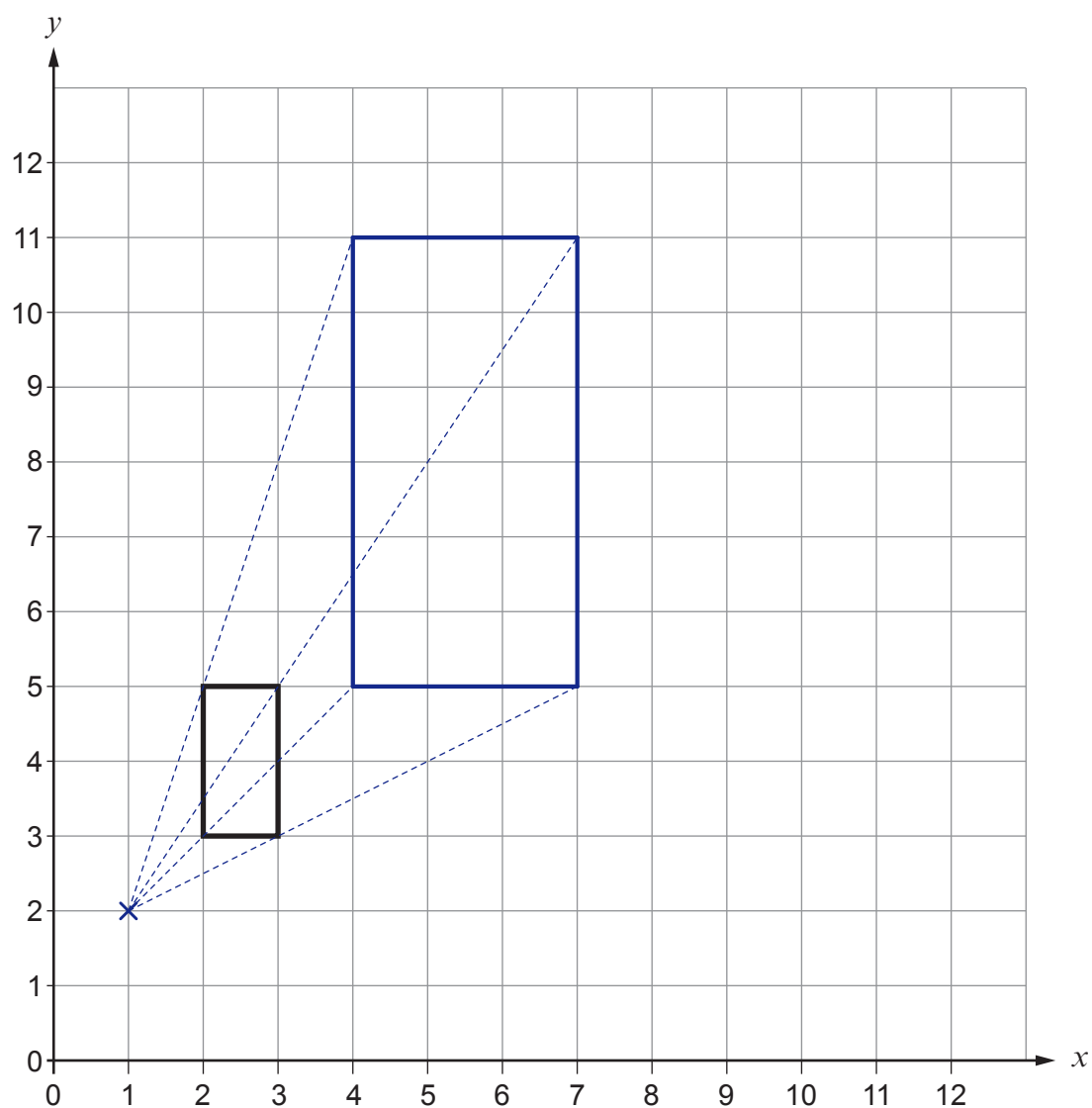
$(3, 2) \rightarrow (3 - 9, 2 - 10) = (-6, -8)$, so $a = -6$

$a = -6$

$b = -5$



- (b) Draw an enlargement of the rectangle below, using a scale factor of 3 and centre (1, 2). [3]



17. Alison and Sarfraz play a game. They each have a different bag of cards.

Alison has the following cards in her bag.



Sarfraz has the following cards in his bag.



They each take a card at random from their own bag. They make a note of the letter, and return the card to the bag.

They each do this 100 times.

Who do you think is likely to choose the letter R more often?

Alison

☐

Sarfraz

☒

You must explain your decision and show all your working.

[4]

Alison: 2 R cards out of 10, so $P(R) = 2/10 = 0.2$

Sarfraz: 1 R card out of 4, so $P(R) = 1/4 = 0.25$

Each person takes 100 cards:

Alison expects $0.2 \times 100 = 20$ R cards

Sarfraz expects $0.25 \times 100 = 25$ R cards

$25 > 20$ ($0.25 > 0.2$)

Sarfraz is likely to choose the letter R more often,

because his probability of choosing R is higher.



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