Surname	Centre Number	Candidate Number
Other Names		0

GCSE

3300U10-1

A17-3300U10-1

MATHEMATICS
UNIT 1: NON-CALCULATOR
FOUNDATION TIER

FRIDAY, 10 NOVEMBER 2017 – MORNING

1 hour 30 minutes

ADDITIONAL MATERIALS

The use of a calculator is not permitted in 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 continuation page at the back of the booklet. Question numbers must be given for all work written on the continuation page.

Take π as 3·14.

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.	2	
2.	4	
3.	3	
4.	3	
5.	3	
6.	2	
7.	2	
8.	3	
9.	5	
10.	3	
11.	4	
12.	6	
13.	3	
14.	4	
15.	3	
16.	1	
17.	9	
18.	5	
Total	65	

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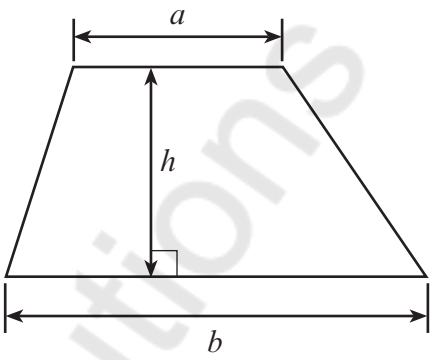
Formula List - Foundation Tier

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



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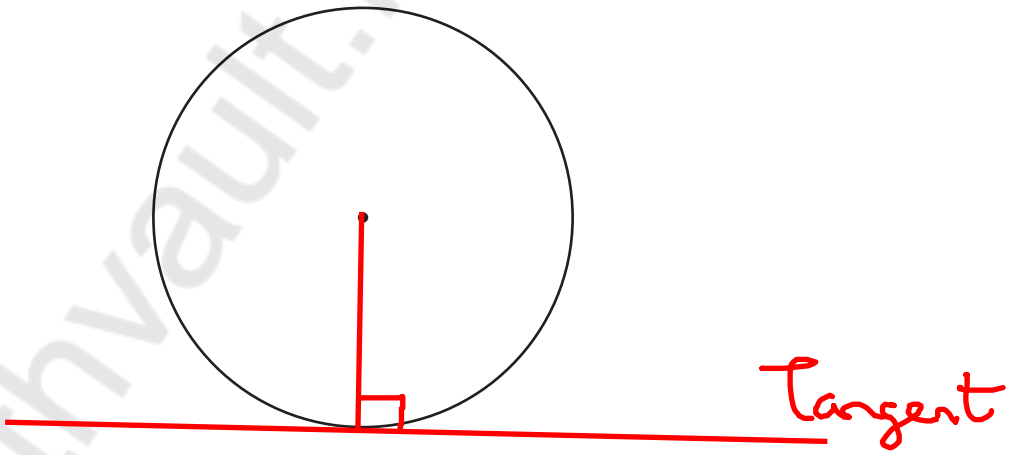
1. Each of these circles has its centre marked with • .

(a) Draw a diameter of this circle. [1]

Diameter of a circle is a line that run from one part of the circumference to the other side of the circumference and passing through the centre.

(b) Draw a tangent to this circle. [1]



A tangent is a straight line that touches the circumference of the circle at only one point

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2. Write a number in each space to make these calculations correct. [4]

(a) 325 + 317 = 642

(b) 157 – 17 = 140

(c) 80 ÷ 4 = 20

(d) 0·6 × 100 = 60

Space for working:

$0.6 \times 100 = 0.6 \times 10^2$

$= 6 \times 10^{-1} \times 10^2 = 6 \times 10^{-1+2}$

$= 6 \times 10^1 = 60$

0.6×100

$\frac{6}{10} \times 100 = 60$

0.6×100

0600

060

60%

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3. Sam has a box with 30 coloured cards in it.
He chooses one card from the box at random.

Total sample space = 30 cards

(a) There is an even chance that Sam chooses a red card.
How many red cards are there in Sam's box? [1]

$Pr(red) = \frac{number\ of\ red}{Total\ Sample\ space}$

$Pr(red) = \frac{1}{2}$

$\frac{1}{2} = \frac{number\ of\ red}{30}$

$number\ of\ red = \frac{30}{2} = 15$

(b) It is impossible for Sam to choose a yellow card.
How many yellow cards are there in Sam's box? [1]

$Pr(yellow) = \frac{number\ of\ yellow}{Total\ Sample\ space}$

$Pr(yellow) = 0$

$0 = \frac{number\ of\ yellow}{30}$

$number\ of\ yellow = 0$

(c) It is unlikely that Sam chooses a blue card.
What is the smallest number of blue cards that Sam could have in his box? [1]

1, 2, 3, 4,

So, the smallest number of blue cards is 1

4. *(a)* Write down the mode of these numbers. [1]

~~64~~ 54 ~~65~~ ~~45~~ 54 ~~84~~ ~~66~~ ~~85~~

Mode is the highest occuring frequency in a data.

Mode = 54

(b) Write down the median of these numbers. [2]

16 13 20 25 18 22 17 27 24

Median is the central number of a well arrange data.

Median = 20

13, 16, 17, 18, 20, 22, 24, 25, 27

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5. *(a)* What fraction of the following diagram is shaded?

Write your answer in its simplest form. [2]

1	6	7	2	8
9	3	10	11	4
12	13	5	14	15

Shaded fraction = number of shaded part / total available part = 5/15

Shaded part = 1/3

(b) Shade 40% of the following diagram. [1]

40% = 40/100 = 8/20

40% = 8 out of 20

So, we need to shade 8 out 20.

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6. *(a)* The number 43 728 is to be written correct to the nearest thousand.
Circle the correct answer. [1]

44 730 | 43 000 | 40 000 | 43 700 | 44 000

43728 = 43000 = 44,000

(b) One of these numbers is both a square number **and** a factor of 63.
Circle the correct answer. [1]

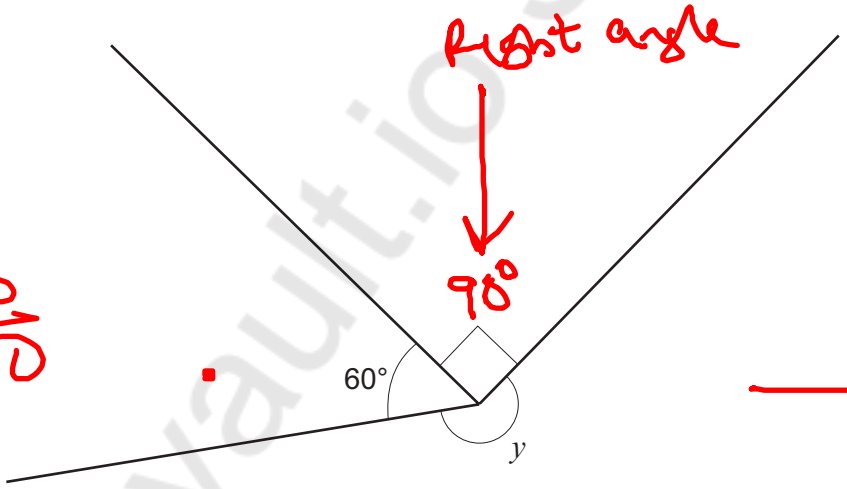
7 × 9 = 63

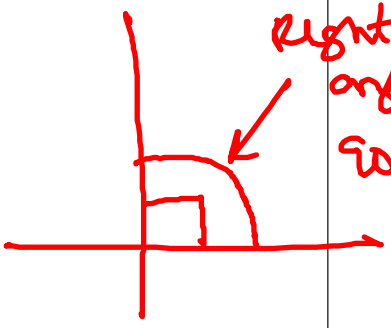
3 | 21 | 9 | 16 | 7

9 and 16 are the only square number

63 ÷ 9 = 7. Therefore 9 is a square number and a factor of 63

7. Work out the size of angle y. [2]





360 − 150 = 210

Diagram not drawn to scale

Sum of angle at a point is 360°

y + 60 + 90 = 360

y + 150 = 360

−150 −150

y = 210°

y = 210 °

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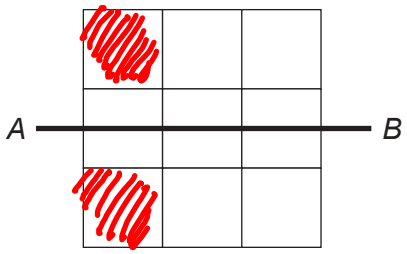
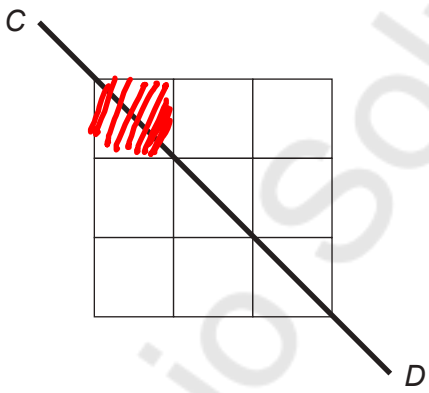
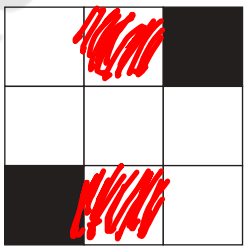
8. *(a)* Shade **exactly two** squares so that *AB* is the **only** line of symmetry for this diagram. [1]



(b) Shade **exactly one** square so that *CD* is the **only** line of symmetry for this diagram. [1]



(c) Shade **exactly two more** squares so that this diagram still has rotational symmetry of order 2. [1]



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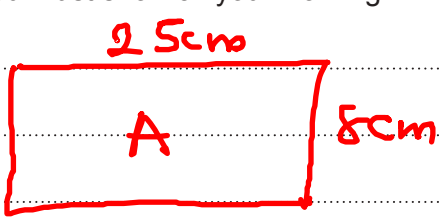
9. *In this question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

Rectangle A measures 25 cm by 8 cm.
Rectangle B is five times as long and five times as wide as rectangle A.
What is the perimeter of rectangle B?
You must show all your working. [3 + 2 OCW]



25 × 5 = 125 So, the lenght of rectangle B is 5 times of rectangle A

$L_B = 5 \times 25 = 125\text{cm}$ ✓

Also, the width of rectangle B is 5 times of rectangle A

$W_B = 5 \times 8 = 40\text{cm}$ ✓

Perimeter of a rectangle is given as:

165 × 2 = 330 $P = 2(L+W) = 2(125+40)$

$P = 2 \times 165 = 330\text{cm}$

Perimeter of rectangle B is 330cm

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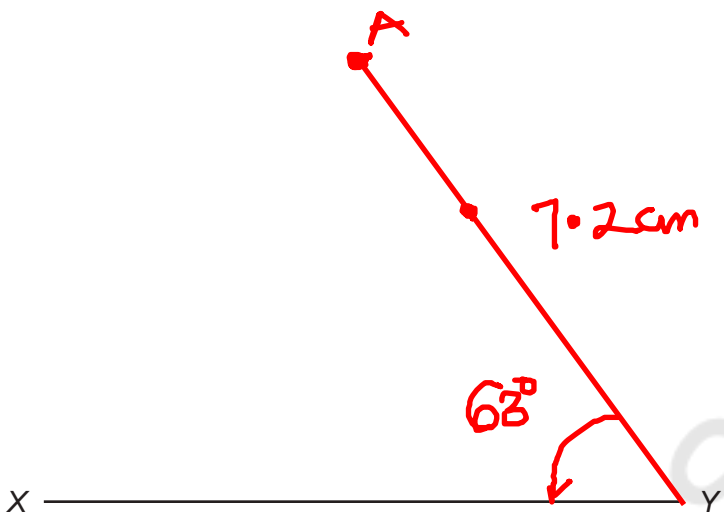
10. *(a)* On the diagram, mark the point *A* with a cross so that: [2]

- $X\hat{Y}A = 63°$, and
- $YA = 7{\cdot}2$ cm.

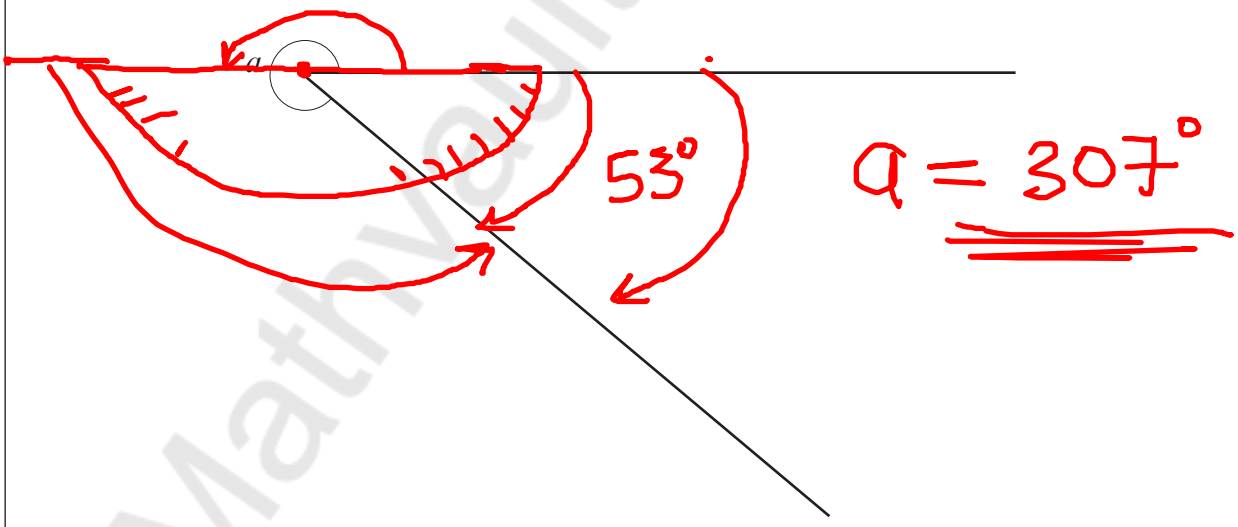
Protractor



(b) Using a protractor, find the size of angle a. [1]

$a + 53 = 360$

$a = 360 - 53°$



$a = 307°$

$a =$ ..... °

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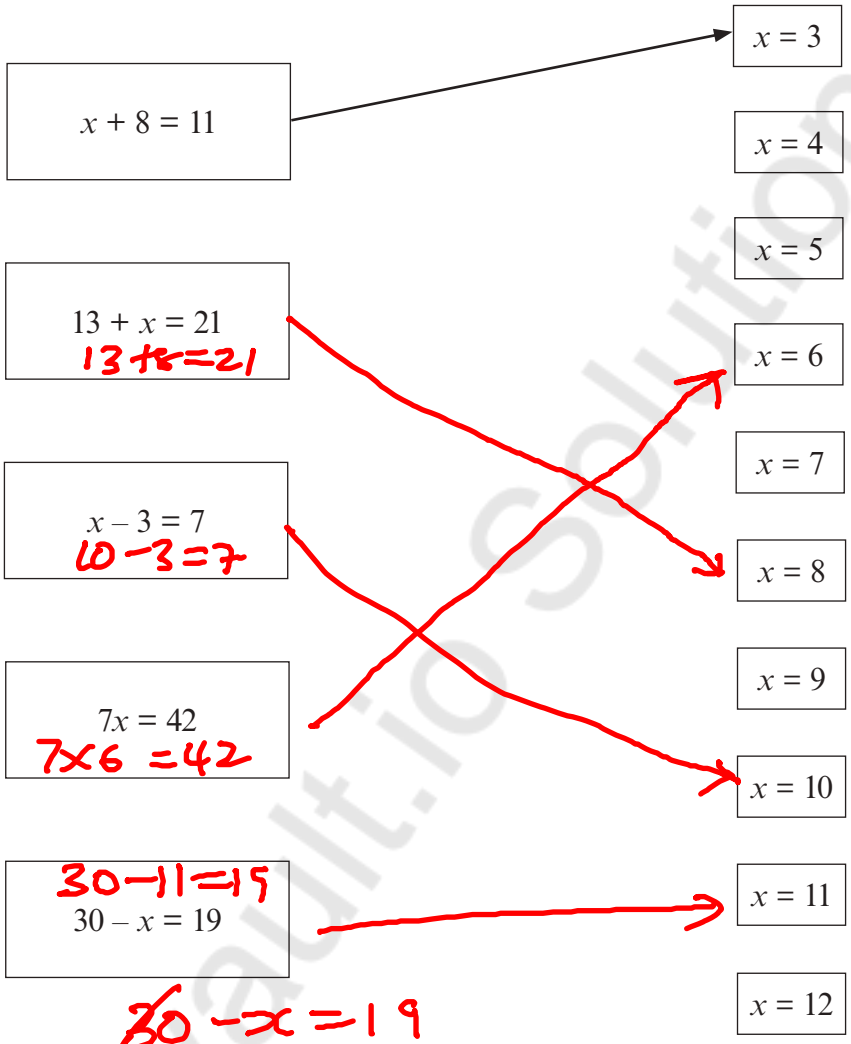
11. Match each equation with its solution.

The first one has been done for you. [4]



Space for working:

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12. Calculate each of the following.

$3^4 \rightarrow 2\times3\times3\times3$ 27 $\frac{3}{81}$ 2

9 27 81

(a) $3^4 \times 10^3$ [2]

$3^4 \times 10^3$

$81 \times 10^3 = 81 \times 1000 = 81{,}000$

8.1×10^4

1000

10x10x10

(b) $5{\cdot}6 - 3{\cdot}82$ [1]

$4\overset{1}{5}\cdot\overset{15}{\cancel{6}}0$

$-\ 3\cdot82$

$1\cdot78$

$1\cdot78$

(c) $\frac{5}{6} - \frac{2}{3}$ [2]

$\frac{5}{6} - \frac{2}{3} = \frac{5-4}{6} = \frac{1}{6}$

$\frac{5}{6} - \frac{2\times2}{3\times2} = \frac{5}{6} - \frac{4}{6}$

$= \frac{5-4}{6} = \frac{1}{6}$

(d) $0{\cdot}2 \times 0{\cdot}3$ [1]

$0{\cdot}2 \times 0{\cdot}3 = 0{\cdot}06$

$= 0{\cdot}06$

$\frac{2}{10} \times \frac{3}{10}$

$\frac{6}{100} = 0{\cdot}06$

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13. Circle either TRUE or FALSE for each of the following statements. [3]

The expression $g \times g \times g$ can be written as $3g$	TRUE	FALSE
The expression $7y - y$ can be written as 7	TRUE	FALSE
$\frac{a}{4} \div a = \frac{1}{4}$	TRUE	FALSE
$\frac{a}{2} + \frac{a}{2} = a$	TRUE	FALSE
When $a = 1$, $b = 2$ and $c = 3$, $a + b + c = abc$	TRUE	FALSE

Space for working:

$g \times g \times g = g^3$ $\quad g + g + g = 3g$

$7y - y = 6y$

$\frac{a}{4} \div \frac{a}{1} = \frac{a}{4} \times \frac{1}{a} = \frac{1}{4}$

$\frac{a}{2} + \frac{a}{2} = \frac{a+a}{2} = \frac{2a}{2} = a$

$a + b + c = abc$ $\quad a=1 \quad b=2 \quad c=3$

$1 + 2 + 3 = 1 \times 2 \times 3$

$6 = 6$ $\quad LHS = RHS$

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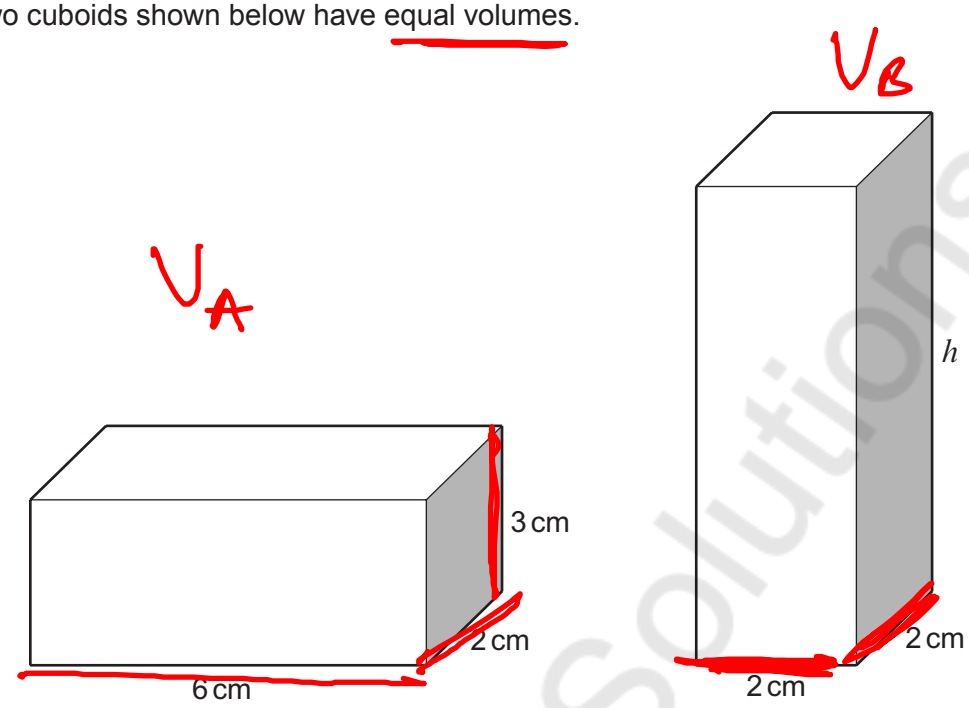
14. The two cuboids shown below have equal volumes.



Cuboid A **Cuboid B**

Diagrams not drawn to scale

Volume of cuboid = Lbh

Calculate the height h of Cuboid B.
You must show all your working. [4]

$V_A = V_B$

$L_A \times B_A \times H_A = L_B \times B_B \times H_B$

$6 \times 2 \times 3 = 2 \times 2 \times h$

$36 = 4h$

$\frac{36}{4} = \frac{4h}{4}$

$9 = h$

$h = 9\text{ cm}$

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15. A fraction is written as $\frac{a}{b}$.

- The fraction is a multiple of 0·2.
- The fraction is greater than $\frac{1}{2}$.
- The fraction is less than 75%.

Write down the fraction as $\frac{a}{b}$, where a and b are whole numbers. [3]

Answer = ...

16. Expand $5(3x - 2)$. [1]

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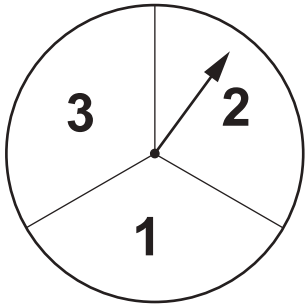
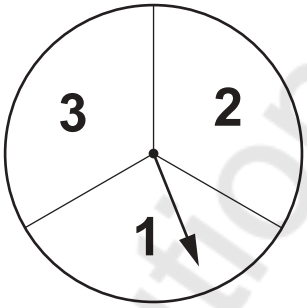
17. Sara is in charge of a game at her school's Christmas party.

Two fair spinners are spun as shown in the example below.



1st Spinner



2nd Spinner

People can make a two-digit number using the numbers shown on the spinners using the following rule:

> Multiply the number on the first spinner by 10 and then add the number on the second spinner.

One example, as shown above, makes the number 21, because $2 \times 10 + 1 = 21$.

(a) How many different numbers can be made playing this game? [1]

11 12 13 21 23 22 31 32 33

9

(b) Write down all the prime numbers that can be made playing this game. [2]

11, 13, 23, 31

(c) What is the probability that a person makes a prime number when playing the game once? [2]

Pr(prime number) = $\frac{\text{Number of Prime numbers}}{\text{Total Sample Space}}$

Pr (Prime Number) = $\frac{4}{9}$

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(d) Sara charges each person £1 to play the game once.
Each player who makes a prime number from their spins wins £2.
How much profit would the school expect to make when 180 people play the game? [4]

Charges = £1

If a player makes prime number, the player wins £2.

Total number of players = 180

Total income [without winning] = £1 × 180
= £180

Pr(prime) = $\frac{4}{9}$ [4 out of 9 people]

Total people will play prime = $\frac{4}{9} \times 20$

= 80

So if 80 players win

The total payout by the organiser = £2 × 80
= £160

Profit = £180 − £160
= £20

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18. *ABCD* is a quadrilateral.
$A\hat{B}C = 93°$, $B\hat{C}D = 122°$ and $A\hat{D}C = 85°$.
Points *P* and *Q* lie on the quadrilateral as shown, such that *AP* = *AQ*.

Prove that triangle *APQ* is an equilateral triangle.
You must show all your working. [5]

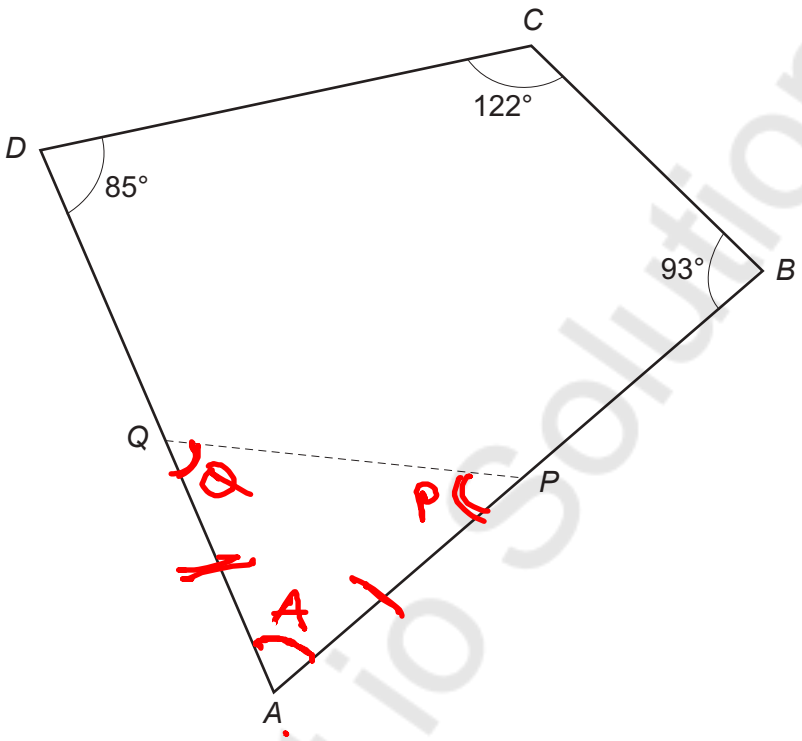

Diagram not drawn to scale

122 + 93 = 215
85 + 300

Sum of angle in a quadrilateral is 360°
A + 85 + 122 + 93 = 360
A + 300 = 360
−300 −300
A = 60°
Since ΔAPQ is isosceles from explanation
∠P = ∠Q
∠A + ∠P + ∠Q = 180° [sum of angle in a triangle]
60 + ∠P + ∠Q = 180
−60 −60
∠P + ∠Q = 120
Since ∠P = ∠Q
∠P = 60 ∠Q = 60
Since ∠A = ∠P = ∠Q = 60°.

END OF PAPER

Thus, $\triangle APQ$ is an equilateral triangle.

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