Q1

1

We can estimate the number of times Megan will roll a 5 by multiplying the number of times she is going to roll the dice by the probability that the dice will land on a 5.

$$400 \times 0.3$$

[1]

120 [1]

Q2

We can use the fact that the total of all the probabilities must sum to 1.
Here there are only two possibilities, grow and not grow, therefore subtract the 'grow' probability from 1 to get the 'not grow' probability:

$$1 - 0.75 = 0.25$$

0.25 [1]

2b

We can estimate the number of seeds that will grow by multiplying the number of seeds Jane plants by the probability that a seed will grow.

$$200 \times 0.75$$

[1]

150 [1]

Q3

We can use the fact that the total of all the probabilities must sum to 1.
If we call the probability that the ball is blue "B", then

$$0.16 + 0.4 + B + 0.24 = 1$$

[1]

Solve for B

$$B = 1 - (0.16 + 0.4 + 0.24) = 0.2$$

0.2 [1]

3b

There are 125 counters in the bag.
The number of green counters in the bag is unknown, so call it n.
The probability of taking a green counter is 0.16.
Use this to form an equation for the probability of taking a green counter:

$$\frac{n}{125} = 0.16$$

[1]

Solve for n by multiplying both sides by 125:

$$n = 125 \times 0.16$$
$$n = 20$$

20 green counters [1]

Q4

There are 200 pens in the box.
The number of black pens in the box is unknown, so call it n.
The probability of taking a black pen is 0.3.
Use this to form an equation for the probability of taking a black pen:

$$\frac{n}{200} = 0.3$$

[1]

Solve for n by multiplying both sides by 200:

$$n = 200 \times 0.3$$
$$n = 60$$

60 black pens [1]

4b

We can use the fact that the total of all the probabilities must sum to 1.
If we call the probability that the pen is green "G", then

$$0.3 + 0.2 + 0.4 + G = 1$$

[1]

Solve for G

$$G = 1 - (0.3 + 0.2 + 0.4) = 0.1$$

0.1 [1]

Q5

We can use the fact that the total of all the probabilities must sum to 1.
If we let "E" be the probability that the spinner lands on E, then

$$0.25 + 0.10 + 0.20 + 0.15 + E = 1$$

[1]

Solve for E

$$E = 1 - (0.25 + 0.10 + 0.20 + 0.15) = 0.3$$

0.3 [1]

5b

The probability of landing on A or B is the sum of the probability of landing on A and the probability of landing on B

$$\text{P(A or B)} = 0.25 + 0.10 = 0.35$$

[1]

We can estimate the number of times the spinner will land on A or B by multiplying the number of times Chris is going to spin the spinner by the probability that the spinner will land on A or B

$$60 \times 0.35$$

[1]

21 [1]

Q6

We can estimate the number of times John will win by multiplying the number of times he is going to play by the probability that he wins.

$$300 \times 0.65$$

[1]

195 [1]

Q7

We can use the fact that the total of all the probabilities must sum to 1.
If we call the probability of selecting Nilgiri "N", then

$$0.38 + 0.24 + N + 0.16 = 1$$

[1]

Solve for N

$$N = 1 - (0.38 + 0.24 + 0.16) = 0.22$$

0.22 [1]

7b

To find the probability of Darjeeling OR Rize, just add the two probabilities.
(Remember that you can add like this as long as the probabilities are **mutually exclusive**.)

$$0.24 + 0.16$$

[1]

0.4 [1]

Q8-9

We can estimate the number of times the spinner will land on blue by multiplying the number of times Rayyan is going to spin the spinner by the probability that the spinner will land on blue.

$$280 \times 0.4$$

[1]

112 [1]

9

We can use the fact that the total of all the probabilities must sum to 1.
If we call the probability of selecting mint "M", then

$$0.35 + 0.32 + M + 0.12 = 1$$

[1]

Solve that equation for M

$$M = 1 - (0.35 + 0.32 + 0.12) = 0.21$$

To find the probability of strawberry OR mint, just add the two probabilities.
(Remember that you can add like this as long as the probabilities are **mutually exclusive**.)

$$0.32 + 0.21$$

[1]

0.53 [1]

Q10-11

The best estimate is the one coming from the most number of throws
The last column has the most number of throws (250) so use its relative frequency

0.3 [1]

11

Find the probability of getting tails (by subtracting 0.6 from 1)

1 - 0.6 = 0.4

Work out the expected number of tails by multiplying 500 by 0.4

500 × 0.4 = 200

the **second** option is therefore correct, **200** [1]

Q12

Fill in the table by adding the first card value (top row) to the second card value (first column)

		First card				
	Total	2	2	3	5	6
Second card	2	4	4	5	7	8
	2	4	4	5	**7**	8
	3	5	5	**6**	8	9
	5	7	**7**	8	10	11
	6	8	8	9	11	12

[1]

12b

(i) Count how many even numbers there are in the grid (not including the row headings and the column headings)

13 even numbers

13 possibilities out of all 25 possibilities in the grid are even
Write this as a probability (13 divided by 25)

fraction with denominator of 25 [1]

$\frac{13}{25}$ [1]

(ii) Count how many numbers in the grid could be labelled "a multiple of 3 or 4" (not including the row headings and the column headings)
Do not count multiples of both 3 and 4 twice

25

(ii) Count how many numbers in the grid could be labelled "a multiple of 3 or 4" (not including the row headings and the column headings)
Do not count multiples of both 3 and 4 twice

14 numbers

14 possibilities out of all 25 possibilities in the grid are a multiple of 3 or 4
Write this as a probability (14 divided by 25)

fraction with denominator of 25 [1]

$\frac{14}{25}$ [1]

Q13

Find the angle in the pie chart for Vlad to be correct (by dividing 360 by 5)

$$360 \div 5 = 72°$$

For Vlad to be correct, the angle needs to be 72° but it looks to be smaller than that on the pie chart

The angle is not equal to 72° [1]

Accept also "the angle is too small", "the angle is less than a fifth", "the angle is 26–30 degrees", "the area is too small" or "the area is less than a fifth"

Q14

Fill in the table by multiplying the number on spinner A (top row) by the number on spinner B (first column)

Spinner A

Spinner B	x	1	7	9
	2	2	14	18
	3	3	21	27
	4	4	28	**36**
	5	5	35	**45**

[1]

14b

There are 6 even numbers (2, 4, 14, 18, 28, 36) and 3 prime numbers (2, 3, 5) but 2 appears in both lists - Geoff has counted 2 twice
The correct probability of being even or prime is 8 out of 12

Geoff counted 2 twice [1]

the correct probability is $\frac{8}{12}$ [1]

Accept "2 is both prime and even", "one number is prime and even", accept $\frac{8}{12}$ in other forms

Q15

If 12 out of 28 of Jeat's carrots grow, then the probability of one of his carrots growing is 12 divided by 28

$$\frac{12}{28}$$

This can be simplified by dividing top-and-bottom by 4

$$\frac{12}{28} = \frac{3}{7}$$

$\frac{3}{7}$ [1]

$\frac{12}{28}$ must be seen

15b

(i) $\frac{3}{7}$ of an amount of carrots needs to equal 10 000

Call the amount x and form an equation

$$\frac{3}{7} \times x = 10\,000$$

Multiply both sides by 7 and divide both sides by 3

$$x = \frac{10\,000 \times 7}{3}$$

[1]

Multiply both sides by 7 and divide both sides by 3

$$x = \frac{10\,000 \times 7}{3}$$

[1]

Work out this value

$$x = 23333.333...$$

Round this to the nearest whole number, as x is a number of carrots (so can't be a decimal)

23 333 carrots [1]

whole numbers from 23 000 to 23 334 (inclusive) are accepted
(to guarantee at least 10 000 whole carrots, 23 334 carrots are needed as 23 333 are not quite enough)

ii) Comment on the fact that Jeat's garden and the farm are different environments or that Jeat's sample is too small to make big decisions from

The growing conditions on the farm may be different to the garden [1]

Accept also "Jeat's sample is too small"
References to part (b)(i) not being an integer are not accepted

Q16

(i) Fill in the table by multiplying the number on the first spin (top row) by the number on the second spin (first column)

	First spin					
	x	1	2	2	3	4
Second spin	1	1	**2**	**2**	**3**	**4**
	2	**2**	**4**	4	**6**	**8**
	2	**2**	**4**	**4**	**6**	**8**
	3	**3**	**6**	**6**	**9**	**12**
	4	**4**	**8**	**8**	12	**16**

complete with up to 5 errors [1]
complete and correct [1]

(i) Count the number of possibilities in the grid that are multiples of 3 (do not include the first row and first column)

there are 9 multiples of 3 in the grid

Work out the probability of choosing one of these 9 possibilities out of the total 25 possibilities (9 ÷ 25)

a fraction over 25 [1]

$\frac{9}{25}$ [1]