The probability that a biased dice will land on a five is 0.3

Megan is going to roll the dice 400 times.

Work out an estimate for the number of times the dice will land on a five.

$P(\text{landing on a 5}) = 0.3$ ← means lands on 5, three times in every 10 goes.

No. of times the biased dice lands on 5 in 400 goes =

$$0.3 \times 400 = 120 \text{ times}$$

1. There are 3 red pens, 4 blue pens and 5 black pens in a box.
   Sameena takes a pen, at random, from the box.

   (a) Write down the probability that she takes a black pen.

   $$3 \text{ Red}$$
   $$4 \text{ Blue}$$
   $$5 \text{ Black}$$

   Total = 12

   $$P(\text{Black pen}) = \frac{5}{12}$$

   (b) Write down the probability that Sameena takes a pen that is **not** black.

   $$P(\text{Pen that is not black}) = \frac{7}{12}$$

   $$\left(\text{Red and Blue are not Black} \right)$$

1. Each student at a college studies one of four languages.

The table shows the probability a student chosen at random studies German or Russian or French.

Language	German	Spanish	Russian	French
Probability	0.2		0.1	0.5

A student is chosen at random.

(a) Work out the probability that the student studies Spanish.

$$0.2$$
$$0.1$$
$$+ 0.5$$
$$\overline{0.8}$$

$P(\text{Spanish}) = 1 - 0.8 = 0.2$

.......................0.2.......................

(2)

There are 800 students at the college.

(b) Work out the number of students who study German.

No. of students who study German = 0.2 × 800

= 160 students

9. Riki has a packet of flower seeds.

The table shows each of the probabilities that a seed taken at random will grow into a flower that is pink or red or blue or yellow.

Colour	pink	red	blue	yellow	white
Probability	0.15	0.25	0.20	0.16	

(a) Work out the probability that a seed taken at random will grow into a white flower.

P(seed grows into a white flower) =

0.15
0.25
0.20
0.16
___
0.76

$1 - 0.76 = 0.24$

0.24

(2)

There are 300 seeds in the packet.

All of the seeds grow into flowers.

(b) Work out an estimate for the number of red flowers.

$P(Red) = 0.25 = \frac{1}{4}$ So Number of Red Flower $= \frac{1}{4} \times 300$

$= 75$ flowers

2. A spinner can land on red or blue or pink.
The table shows the probabilities that the spinner will land on red or on blue.

Colour	red	blue	pink
Probability	0.58	0.30	

Work out the probability that the spinner will land on pink.

$P(\text{spinner lands on pink}) = 1 - 0.88 = 0.12$

$$\begin{array}{r} 0.58 \\ 0.30 \\ \hline 0.88 \end{array}$$

0.12

(Total

£ ....

8. Angel Ltd manufacture components for washing machines. The probability that a component will be made within a tolerance of one tenth of a millimetre is 0.995.

Angel Ltd. manufacture 10 000 components each day.

Work out an estimate for the number of components that will not be within the tolerance of one tenth of a millimetre each day.

Prob. $= 0.995$
of tolerance
$\frac{1}{10}$ of mm

Prob. of tolerance NOT $\frac{1}{10}$ of mm
$= 1 - 0.995$

$= \begin{array}{r} 1.000 \\ -0.995 \\ \hline 0.005 \end{array}$

0.005
....

(Total 3 marks)

.... cm

2. A spinner can land on red or blue or pink.
   The table shows the probabilities that the spinner will land on red or on blue.
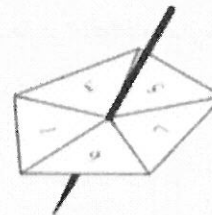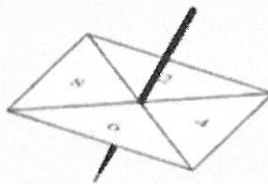
Colour	red	blue	pink
Probability	0.58	0.30	

Work out the probability that the spinner will land on pink.

Prob. of pink = 1 − 0.88 = 0.12

0.58
0.30
――――
0.88

0.12
....

The four-sided spinner is labelled 2, 4, 6, 8
The five-sided spinner is labelled 1, 3, 5, 7, 9

Louise adds the score on the four-sided spinner to the score on the five-sided spinner.
She records the possible total scores in a table.

4-sided spinner

+	2	4	6	8
1	3	5	7	9
3	5	7	9	11
5	7	9	11	13
7	9	11	13	15
9	11	13	15	17

5-sided spinner

(a) Complete the table of possible total scores.

(1)

(b) Write down all the ways in which Louise can get a total score of 11
     One way has been done for you.

     (2, 9) (7, 4) (5, 6) (3, 8)

(2)

Both spinners are fair.

(c) Find the probability that Louise's total score is less than 6

$\frac{3}{20}$

5. Here are the weights in grams, to the nearest gram, of 15 eggs.

33	46	41	54	51
38	60	44	55	51
62	55	52	37	63

(a) Complete the ordered stem and leaf diagram to show this information.
You must include a key.

```
3 | 3 8 7
4 | 6 1 4
5 | 5 2 5 1 1 4
6 | 2 0 3
```

In order of wt.

```
3 | 3 7̶ 8
4 | 1 4 6
5 | 1 1 2̶ 4̶ 4 5 5
6 | 0 2 3
```

Key
4|1 means
41g

(3)

Meg is going to pick at random one of the eggs.

(b) Work out the probability that this egg will have a weight of more than 45 grams.

$$P(>45g) = \frac{10}{15} = \frac{2}{3}$$

5. There are only red counters, blue counters and green counters in a bag.
There are 5 red counters.
There are 6 blue counters.
There is 1 green counter.

Jim takes at random a counter from the bag.

(a) Work out the probability that Jim takes a counter that is **not** red ⟵ means Blue + green

5 Red
6 Blue
1 green
─────
12

$1 - \frac{5}{12} = \frac{7}{12}$

$\frac{7}{12}$

(2)

Jim puts the counter back in the bag.
He then puts some more green counters into the bag.

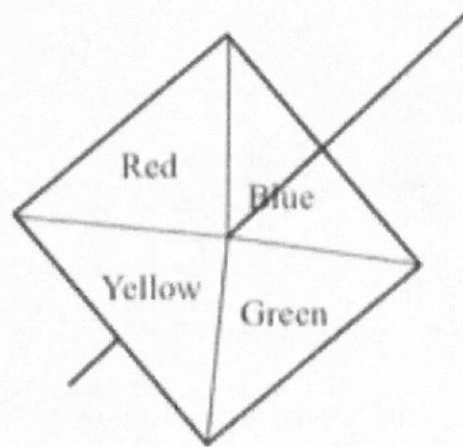The probability of taking at random a red counter is now $\frac{1}{3}$

(b) Work out the number of green counters that are now in the bag.

So he put in
3 green counters in the bag.

$P(Red) = \frac{1}{3} = \frac{?}{12+3} = \frac{5}{15} = \frac{1}{3}$

×5
×5

9. Here is a 4-sided spinner.

The sides of the spinner are labelled Red, Blue, Green and Yellow.
The spinner is biased.
The table shows the probability that the spinner will land on each of the colours Red, Yellow and Green.

Colour	Red	Blue	Green	Yellow
Probability	0.2		0.3	0.1

Work out the probability the spinner will land on Blue.

Prob $= 1 - [0.2 + 0.3 + 0.1]$
$= 1 - 0.6 = 0.4$

5. Fred did a survey of the time, in seconds, people spent in a queue at a supermarket. Information about the times is shown in the table.

Time (t seconds)	Frequency	~~Midpt~~
$0 < t \leqslant 40$	8	~~20~~
$40 < t \leqslant 80$	12	~~60~~
$80 < t \leqslant 120$	14	~~100~~
$120 < t \leqslant 160$	16	~~140~~
$160 < t \leqslant 200$	10	~~180~~

Total 60

A person is selected at random from the people in Fred's survey.

Work out an estimate for the probability that the person selected spent more than 120 seconds in the queue.

$16 + 10 = 26$ people spent more than 120 secs in the queue

$\text{Prob} = \dfrac{26}{60} = \dfrac{13}{30}$

$\dfrac{13}{30}$

(Total 2 marks)

Q5

6. Work out an estimate for
$$\frac{412 \times 5.904}{0.195}$$

$$= \frac{400 \times 6}{0.2}$$

$$= \frac{2400 \times 10}{0.2 \times 10} = \frac{2400}{2}$$

$$= 1200$$