1. When a drawing pin is dropped it can land point down or point up.

   Lucy, Mel and Tom each dropped the drawing pin a number of times.

   The table shows the number of times the drawing pin landed point down and the number of times the drawing pin landed point up for each person.

	Lucy	Mel	Tom
point down	31	53	16
point up	14	27	9
N° of throws	45	80	25

   Rachael is going to drop the drawing pin once.

   (a) Whose results will give the best estimate for the probability that the drawing pin will land point up?
   Give a reason for your answer.

   Mel, because she threw the pin the most times ✓

   (1)

   Stuart is going to drop the drawing pin twice.

   (b) Use all the results in the table to work out an estimate for the probability that the drawing pin will land point up the first time and point down the second time.

   $$P(Up) = \frac{(14+27+9)}{(45+80+25)}$$

   $$= \frac{50}{150}$$

   $$Probability = \frac{n° \text{ of throws point up}}{total \; n° \text{ of throws}}$$

   $$P(Down) = \frac{(31+53+16)}{150}$$

   $$= \frac{100}{150} \checkmark$$

   $$\frac{50}{150} \times \frac{100}{150} = \frac{2}{9} \checkmark$$

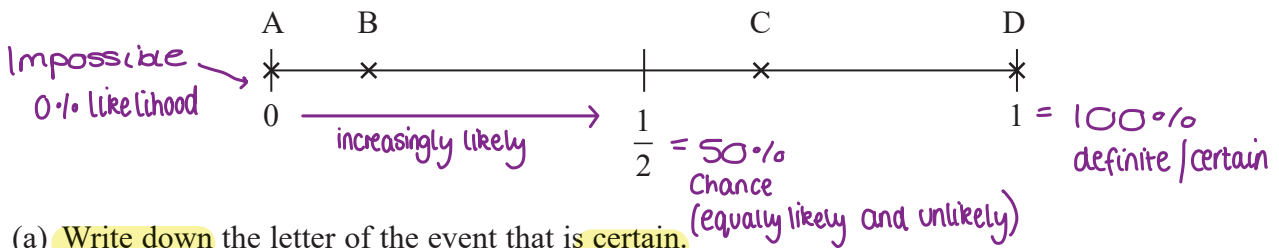 $$\frac{2}{9} \checkmark$$

   (2)

   (Total for Question is 3 marks)

2. Here is a probability scale.
   It shows the probability of each of the events A, B, C and D.

Impossible
0% likelihood ⟶

increasingly likely ⟶

$\frac{1}{2}$ = 50%
Chance
(equally likely and unlikely)

1 = 100%
definite / certain

(a) Write down the letter of the event that is certain.

100% chance of occuring
1

.... D ....

(1)

(b) Write down the letter of the event that is unlikely.

more likely to not happen
than it is to happen
(so less than $\frac{1}{2}$)

however, it is not impossible

.... B ....

(1)

There are 12 counters in a bag.

   3 of the counters are red.
   1 of the counters is blue.
   2 of the counters are yellow.
   The rest of the counters are green. ← how many green?

Caitlin takes at random a counter from the bag.

(c) Show that the probability that this counter is yellow or green is $\frac{2}{3}$

Number of green: Total − red−blue−yellow = green
12 − 3 − 1 − 2 = 6 green

yellow + green
2 + 6 = 8

$\dfrac{\text{yellow+green}}{\text{total counters}}$ $\dfrac{8}{12} \overset{\div 4}{\underset{\div 4}{=}} \dfrac{2}{3}$ as required

(3)

Probability of choosing
a yellow or green counter **(Total for Question 7 is 5 marks)**
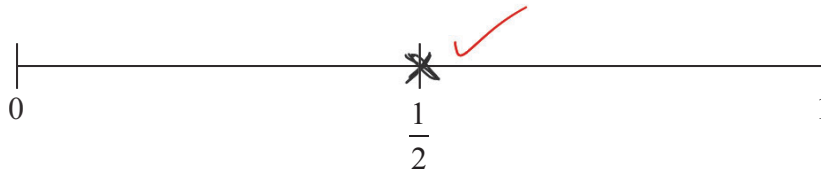
3.   Gita spins a fair 8-sided spinner.

↳ Not biased
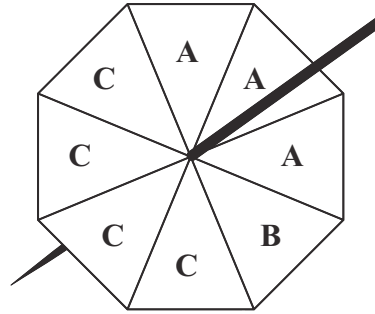
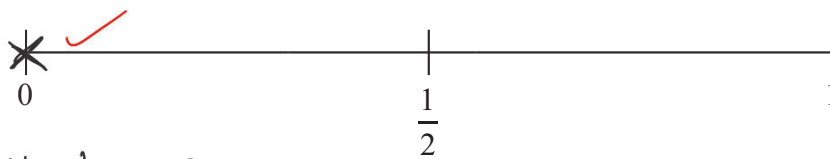$P(c) = \dfrac{\text{Number of } c}{\text{Number of options}}$

$= \dfrac{4}{8} = \dfrac{1}{2}$

(a) On the probability scale, mark with a cross (✗) the probability that the spinner will land on **C**.

0                                    $\dfrac{1}{2}$ 1

(1)

(b) On the probability scale, mark with a cross (✗) the probability that the spinner will land on **D**.

0                                    $\dfrac{1}{2}$ 1

$P(D) = \dfrac{\text{Number of } D}{\text{Number of options}} = \dfrac{0}{8} = 0$

(1)

(Total for Question   is 2 marks)