

M1.

(a) $\frac{1}{6}$

$\frac{5}{6}$

*On every pair of branches**oe**Allow 0.16... or 0.17**Allow 0.83...***B1**

(b) $\frac{1}{6} \times \frac{1}{6}$

or $\frac{1}{6} \times$ their $\frac{1}{6}$

*oe**Allow 0.16... or 0.17**fit their $\frac{1}{6}$ provided $[0, 1]$* **M1**

$\frac{1}{36}$

*oe**Allow 0.027...**Allow 0.03 if working shown**Ignore fw if attempting to convert* *$\frac{1}{36}$ to a decimal, otherwise, do not ignore fw,**eg $\frac{1}{36} \times 2$* **A1ft****[3]**

M2.(a) $3 + 4 = 7$ or $3 : 4 =$ total 7

3 and 4 do not have any common factors (apart from 1)

oe

B1

- (b) $\frac{3}{7}$ and $\frac{4}{7}$ seen
or 2 equivalent fractions

M1

$$\frac{3}{7} \times \frac{3}{7} \text{ or } \frac{4}{7} \times \frac{4}{7} \text{ or } \frac{3}{7} \times \frac{2}{6} \text{ or } \frac{4}{7} \times \frac{3}{6}$$

Maybe on tree diagram with appropriate branches shown and probability calculation shown for at least one pair of branches

M1dep

$$\frac{3}{7} \times \frac{3}{7} + \frac{4}{7} \times \frac{4}{7}$$

$$1 - 2 \times \frac{4}{7} \times \frac{3}{7}$$

M1dep

$$\frac{25}{49}$$

ft $\frac{18}{42} \left(= \frac{3}{7} \right)$ if without replacement calculated

SC2 $\frac{18}{49}$ from $\frac{3}{7} \times \frac{2}{7} + \frac{4}{7} \times \frac{3}{7}$

A1ft

[5]

M3. Lists outcomes

1, 4		4, 1
1, 5	and /	5, 1
1, 6	or	6, 1
2, 4		4, 2
2, 5		5, 2

2, 6

6, 2

$$\text{Even dice 1} = \frac{2}{3}$$

or

$$\text{odd dice 1} = \frac{1}{3}$$

or

$$\text{odd dice 2} = \frac{1}{2}$$

or

$$\text{even dice 2} = \frac{1}{2}$$

M1

One of :

A (both even) has 2 outcomes

B (both odd) has 1 outcome

C (one odd one even) has 3 outcomes

One of:

$$P(\text{both even}) = \frac{1}{2} \times \frac{2}{3} = \frac{1}{3} \text{ or } \frac{2}{6}$$

$$P(\text{both odd}) = \frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$$

$$P(\text{odd and even any order}) = \frac{1}{2} \times \frac{2}{3} + \frac{1}{2} \times \frac{1}{3} = \frac{1}{2} \text{ or } \frac{3}{6}$$

$$\text{or } 1 - \frac{2}{6} - \frac{1}{6}$$

M1 dep

B, A, C

All three shown and correct and BAC

A1

[3]

M4. All correct oe

$$\text{ie each head} = \frac{2}{5} \text{ and each tail} = \frac{3}{5}$$

B2 all pairs of probabilities add to 1 and at least one pair correct

B1 two correct probabilities in correct positions

B3
[3]

M5. (a) $\sqrt{0.36} = 0.6$ or $0.6 \times 0.6 (= 0.36)$
oe

B1

(b) $(1 - 0.6) \times (1 - 0.6)$ or 0.4×0.4
oe

M1

0.16

oe

A1

(c) $1 - 0.36$

oe $0.6 \times (1 - 0.6) \times 2 + (1 - 0.6) \times (1 - 0.6)$

or $0.6 \times (1 - 0.6) \times 2 + \text{their } 0.16$ or $0.4 + 0.6 \times 0.4$

M1

0.64

oe

A1

[5]

M6. (a) $2 + 1 = 3$ or clear connection between 1, 2 and 3

oe eg $\frac{2}{3} + \frac{1}{3} = 1$ or clear connection between $\frac{1}{3}$, $\frac{2}{3}$ and
1

B1

(b) Each probability male $\frac{2}{3}$
 oe $[0.66, 0.67]$

B1

Each probability female $\frac{1}{3}$
 oe 0.33 or better
 SC1 probabilities wrong but all pairs add to 1

B1

(c) $\frac{1}{3} \times \frac{1}{3}$ or $\frac{2}{3} \times \frac{2}{3}$ or $\frac{2}{3} \times \frac{1}{3}$
 or sight of $\frac{1}{9}$ or $\frac{2}{9}$ or $\frac{4}{9}$

M1

Two males = $\frac{4}{9}$ or

Two females = $\frac{1}{9}$ or

MF or FM = $\frac{2}{9}$

Probabilities must be linked with genders

Check on tree if not labelled to ensure correct outcomes being used

M1

One of each = $2 \times \frac{2}{9} = \frac{4}{9}$ or both same = $\frac{4}{9} + \frac{1}{9} = \frac{5}{9}$

Must show how either $\frac{4}{9}$ or $\frac{5}{9}$ is achieved

A1

Two of same (gender more likely)

First A1 must be awarded and decision for 4 marks but if both answers given, both must be correct

A1

[7]

