1.1 Theoretical Probability, Sample Space, Tree Diagrams - Answers

1   **a**

```
    5-cent   10-cent
           H
       H <
           T
           H
       T <
           T
```

b

```
      coin   spinner
             A
        H <  B
             C
             A
        T <  B
             C
```

c

```
   spinner 1   spinner 2
               X
          1 <  Y
               Z
               X
          2 <  Y
               Z
               X
          3 <  Y
               Z
```

d

```
    draw 1   draw 2
             P
        P <  B
             W
             P
        B <  B
             W
             P
        W <  B
             W
```
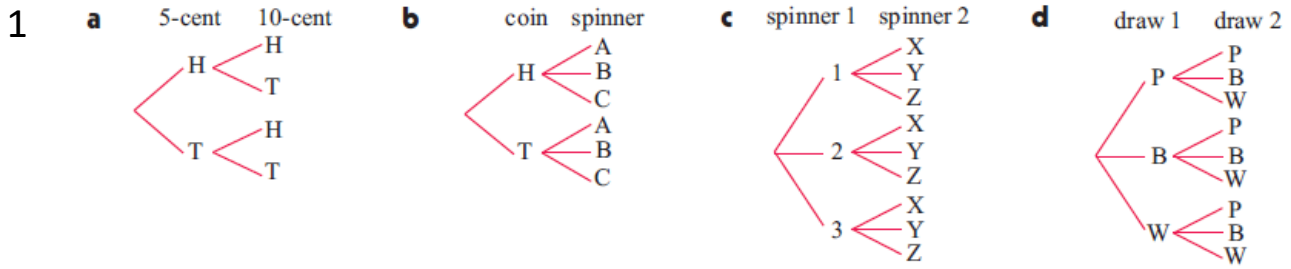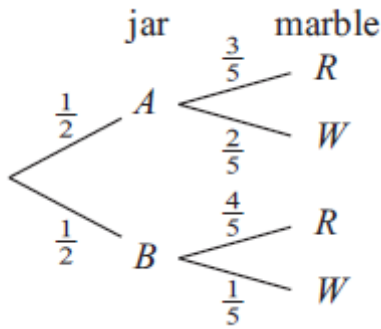
2   **a** $\frac{1}{5}$ **b** $\frac{1}{3}$ **c** $\frac{7}{15}$ **d** $\frac{4}{5}$ **e** $\frac{1}{5}$ **f** $\frac{8}{15}$

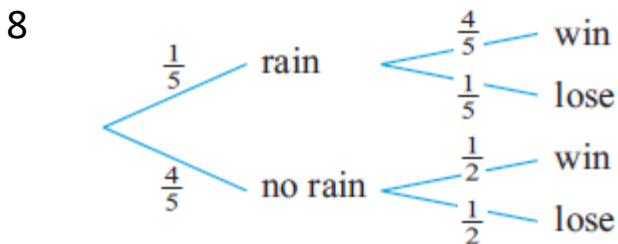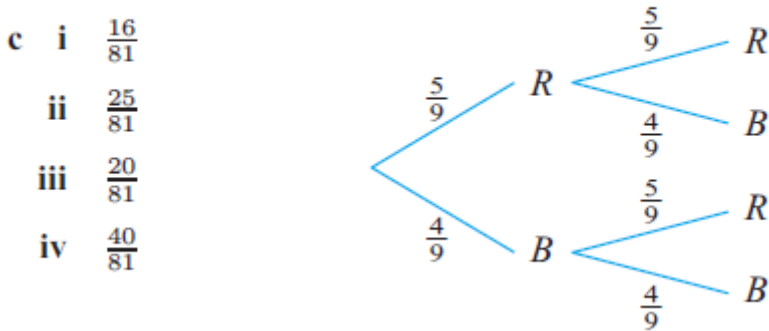**3**   **a** 4   **b** **i** $\frac{2}{3}$ **ii** $\frac{1}{3}$

4   **a** $\frac{1}{4}$ **b** $\frac{1}{9}$ **c** $\frac{4}{9}$ **d** $\frac{1}{36}$ **e** $\frac{1}{18}$ **f** $\frac{1}{6}$ **g** $\frac{1}{12}$ **h** $\frac{1}{3}$

5   **a** $\frac{1}{7}$ **b** $\frac{2}{7}$ **c** $\frac{124}{1461}$ **d** $\frac{237}{1461}$ {remember leap years}

6   **a**

```
        jar        marble
                3/5
                     R
          1/2  A <
                2/5
                     W
                4/5
                     R
          1/2  B <
                1/5
                     W
```

b $\frac{7}{10}$

7   **a** **i** $\frac{5}{9}$ **ii** $\frac{4}{9}$

b

```
      dart 1        dart 2
                   5/9
                        R
            5/9  R <
                   4/9
                        B
                   5/9
                        R
            4/9  B <
                   4/9
                        B
```

c **i** $\frac{16}{81}$

   ii $\frac{25}{81}$

   iii $\frac{20}{81}$

   iv $\frac{40}{81}$

8

```
           4/5
                win
      1/5  rain <
           1/5
                lose
           1/2
                win
      4/5  no rain <
           1/2
                lose
```

$P(\text{win}) = \frac{14}{25}$

9   0.008   5   **a** $\frac{5}{12}$ **b** $\frac{7}{12}$

Answers to the Tricky Questions

10 {AKN, ANK, KAN, KNA, NAK, NKA} **a** $\frac{1}{3}$ **b** $\frac{1}{3}$ **c** $\frac{1}{3}$ **d** $\frac{2}{3}$

11 **a** {ABCD, ABDC, ACBD, ACDB, ADBC, ADCB,
      BACD, BADC, BCAD, BCDA, BDAC, BDCA,
      CABD, CADB, CBAD, CBDA, CDAB, CDBA,
      DABC, DACB, DBAC, DBCA, DCAB, DCBA}

   b **i** $\frac{1}{2}$ **ii** $\frac{1}{2}$ **iii** $\frac{1}{2}$ **iv** $\frac{1}{2}$