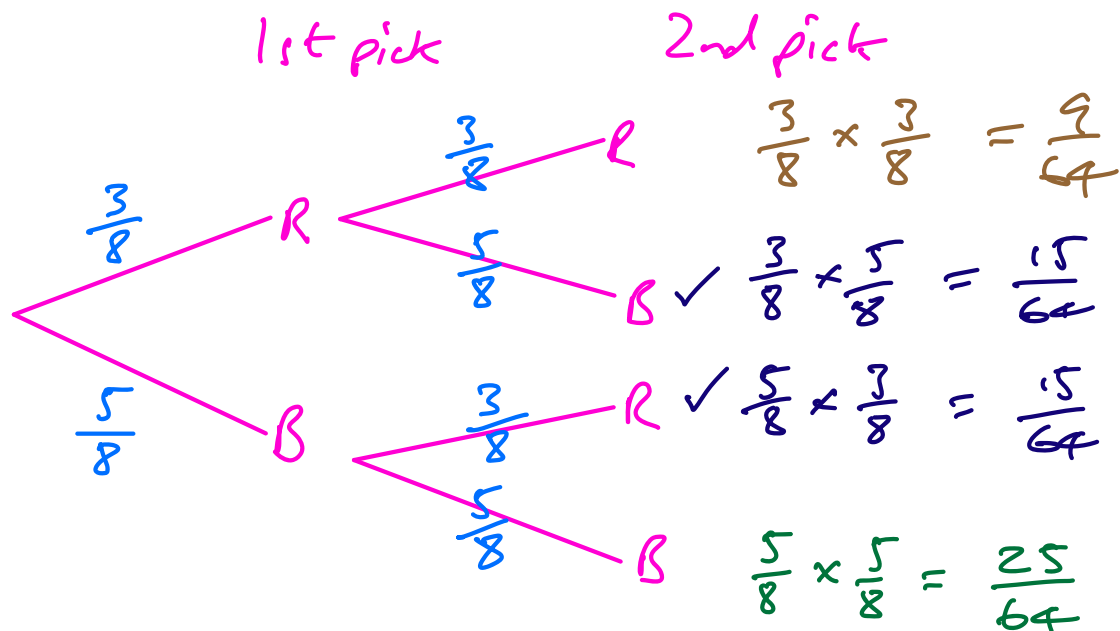# Probability Trees

In a bag there are 5 blue counters and red 3 counters. A counter is drawn at random, its colour noted and it is replaced in the bag. A second counter is drawn and its colour noted.

Represent on a probability tree.

1st pick   2nd pick

$\frac{3}{8}$ R

$\frac{3}{8}$ R $\quad \frac{3}{8} \times \frac{3}{8} = \frac{9}{64}$

$\frac{5}{8}$ B ✓ $\quad \frac{3}{8} \times \frac{5}{8} = \frac{15}{64}$

$\frac{5}{8}$ B

$\frac{3}{8}$ R ✓ $\quad \frac{5}{8} \times \frac{3}{8} = \frac{15}{64}$

$\frac{5}{8}$ B $\quad \frac{5}{8} \times \frac{5}{8} = \frac{25}{64}$

Possible Questions

i) Find prob both blue $= \frac{5}{8} \times \frac{5}{8} = \frac{25}{64}$

ii) Find prob exactly one of each colour

$= P(RB) + P(BR)$

$= \frac{15}{64} + \frac{15}{64} = \frac{30}{64}$

iii) Find prob at least 1 Red

$$= P(RR) + P(RB) + P(BR)$$

$$= \frac{9}{64} + \frac{15}{64} + \frac{15}{64} \qquad = \frac{39}{64}$$
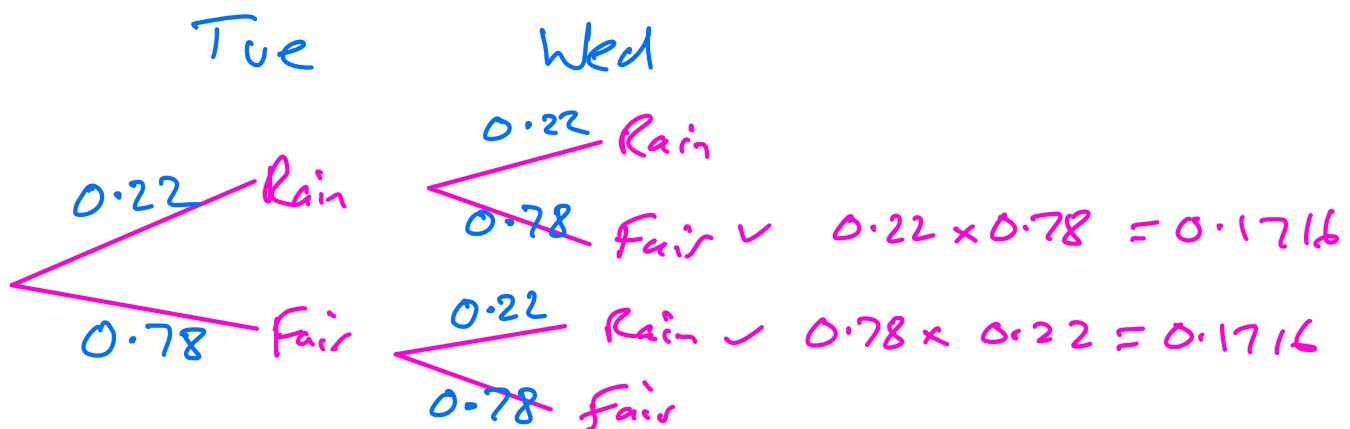
or P(at least 1 Red)

$$= 1 - P(\text{no Red})$$

$$= 1 - P(BB)$$

$$= 1 - \frac{25}{64} \qquad\qquad = \frac{39}{64}$$

The probability it is going to rain on any given day this week = 0.22

Represent on a tree diagram for Tue and Wed

Tue   Wed

0.22 Rain — 0.22 Rain

0.78 Fair ✓   0.22 × 0.78 = 0.1716

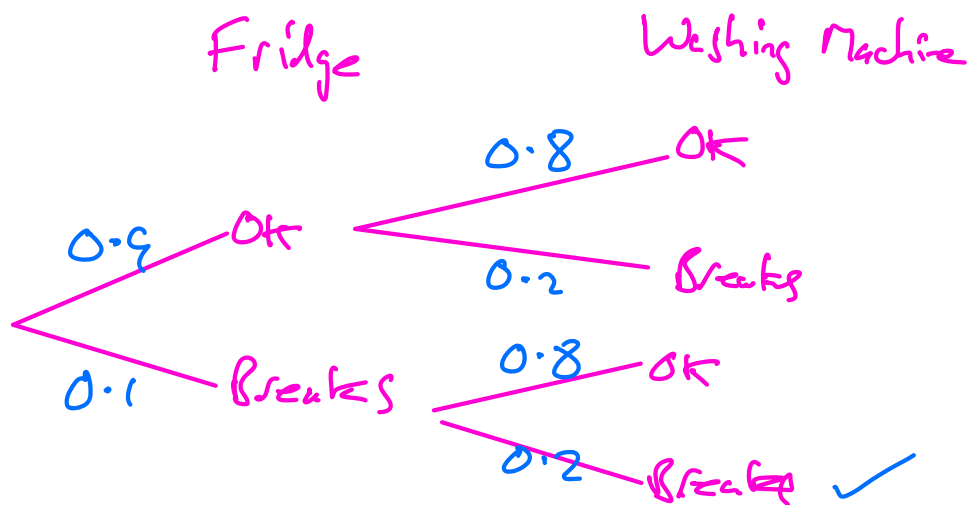0.78 Fair — 0.22 Rain ✓   0.78 × 0.22 = 0.1716

0.78 Fair

Find prob it rains on exactly one
of Tue or Wed

$$= P(RF) + P(FR)$$

$$= 0.1716 + 0.1716$$

$$= 0.3432$$

The prob a fridge breaks down in first
year $= 0.1$. The prob a washing machine
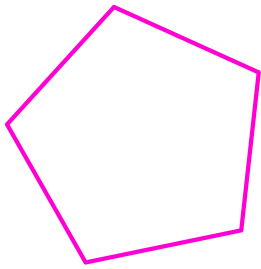breaks down is 0.2. Represent on tree
diagram.

Fridge   Washing Machine

$$
\begin{array}{llll}
 & & & 0.8 \quad OK \\
0.9 & OK & & \\
 & & & 0.2 \quad Breaks \\
 & & & 0.8 \quad OK \\
0.1 & Breaks & & \\
 & & & 0.2 \quad Breaks \checkmark
\end{array}
$$

Find Prob (both break)

$$= 0.1 \times 0.2 = 0.02$$

Hannah's Sweet Problem on Board.

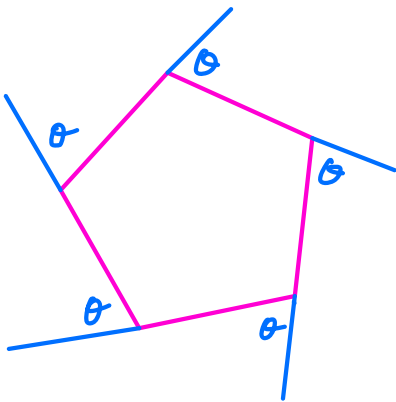# Polygons

Regular Polygons
All sides same length
All angles the same

Exterior angle of regular
n-sided polygon $= \dfrac{360°}{n}$

Pentagon $\dfrac{360}{5} = 72°$

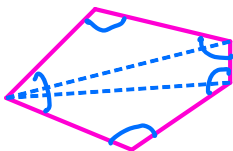Interior angle $= 180° -$ exterior angle

Pentagon Interior $= 180 - 72$
$= 108°$

Sum of interior angles of regular pentagon
$= 108 \times 5 = 540°$
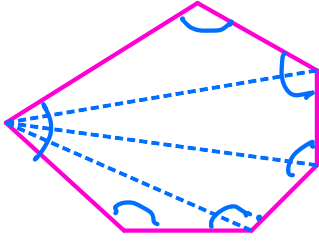
In fact this is true for any pentagon

Angle sum of pentagon
$= 3$ triangles worth

$$3 \times 180 = 540°$$

Hexagon $\quad 4 \times 180° = 720°$

Any n-sided polygon the interior angles sum to $(n-2) \times 180$