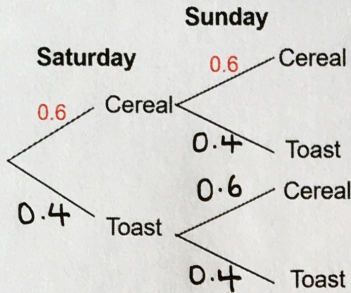# Tree Diagrams for Independent Events

Ray has cereal or toast for his breakfast.
The probability that he has cereal is 0.6.
Ray has breakfast on Saturday and
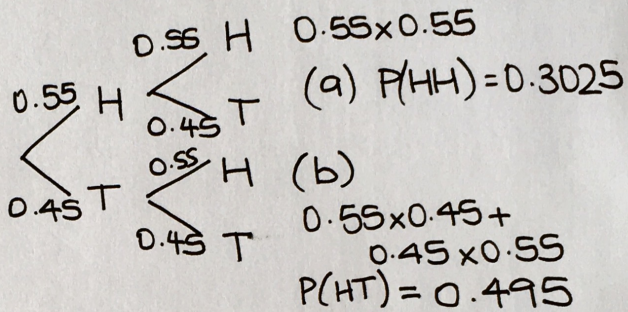Sunday. Complete the tree diagram.

Sunday

Saturday

0.6 — Cereal — 0.6 — Cereal
0.4 — Toast
0.4 — Toast — 0.6 — Cereal
0.4 — Toast

Find the probability that Ray has toast for
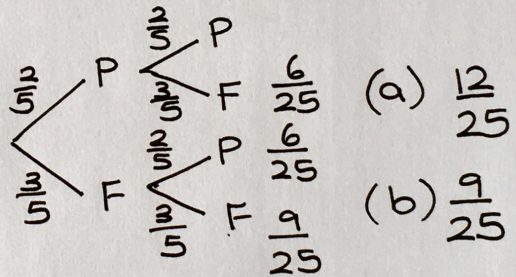breakfast on both days.

$$P(TT) = 0.16$$

Zoya throws a biased coin twice. The
probability that it lands on heads is 0.55.
Represent this with a tree diagram. Find
the probability that:

(a) Zoya gets two heads
(b) Zoya gets one of each - head and tail

0.55 H — 0.55 H — 0.55×0.55
         0.45 T

0.45 T — 0.55 H
         0.45 T

(a) $P(HH) = 0.3025$

(b)
$0.55 \times 0.45 +$
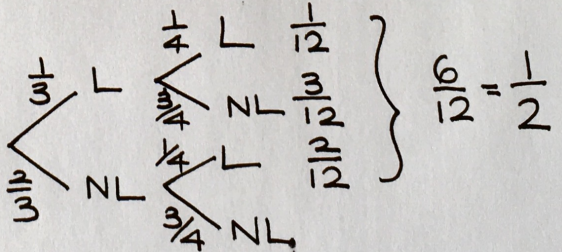$\quad 0.45 \times 0.55$
$P(HT) = 0.495$

Joy and Peter both sit a French test. The
probability of passing the test is $\frac{2}{5}$.
Represent this with a tree diagram. Find
the probability that

(a) only one of them passes the test
(b) they both fail the test

$\frac{2}{5}$ P — $\frac{2}{5}$ P
              $\frac{3}{5}$ F $\frac{6}{25}$
$\frac{3}{5}$ F — $\frac{2}{5}$ P $\frac{6}{25}$
              $\frac{3}{5}$ F $\frac{9}{25}$

(a) $\frac{12}{25}$

(b) $\frac{9}{25}$

The probability that Anna gets up late on a
Monday is $\frac{1}{3}$. The probability that she gets
up late on a Tuesday is $\frac{1}{4}$. Represent this
with a tree diagram. Find the probability
that Anna gets up late on at least one of
the days.

$\frac{1}{3}$ L — $\frac{1}{4}$ L $\frac{1}{12}$
             $\frac{3}{4}$ NL $\frac{3}{12}$
$\frac{2}{3}$ NL — $\frac{1}{4}$ L $\frac{2}{12}$
              $\frac{3}{4}$ NL

$\left.\begin{array}{c}\frac{6}{12} = \frac{1}{2}\end{array}\right.$

Jamal plays three games of Monopoly
against Iris. The probability that Jamal
wins Monopoly is 0.4. Find the probability
that Jamal wins at least two of the three
games.

0.4 W — 0.4 W — 0.4 W 0.064
               0.6 L 0.096
         0.6 L — 0.4 W 0.096
               0.6 L
0.6 L — 0.4 W — 0.4 W 0.096
               0.6 L
         0.6 L — W
               L

$\left.\begin{array}{c} \\ \\ \\ \\ \end{array}\right\}$ 0.352