

**PROBABILITY TREES****EXERCISE**

1. A bag contains 7 blue balls and 3 red balls. A ball is selected at random, its colour noted and it is replaced. A second ball is selected at random and its colour noted. Represent the various possible outcomes on a probability tree and calculate:

- a) The probability both balls selected are the same colour.
  - b) The probability at least one of the balls is red.
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2. John takes exams in Maths and English. The probability he passes in Maths is 0.7 and the probability he passes in English is 0.6. Represent the possible outcomes on a probability tree and calculate:

- a) The probability John fails both exams.
  - b) The probability he passes exactly one of the exams.
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3. The probability it will rain on Saturday is 0.2 and the probability it will rain on Sunday is 0.3. These events are independent. Represent the possible outcomes on a probability tree and calculate:

- a) The probability it does not rain all weekend.
  - b) The probability it rains on both days.
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4. A bag contains 7 blue balls and 3 red balls. A ball is selected at random, its colour noted **BUT IT IS NOT REPLACED**. A second ball is selected at random and its colour noted. Represent the various possible outcomes on a probability tree and calculate:

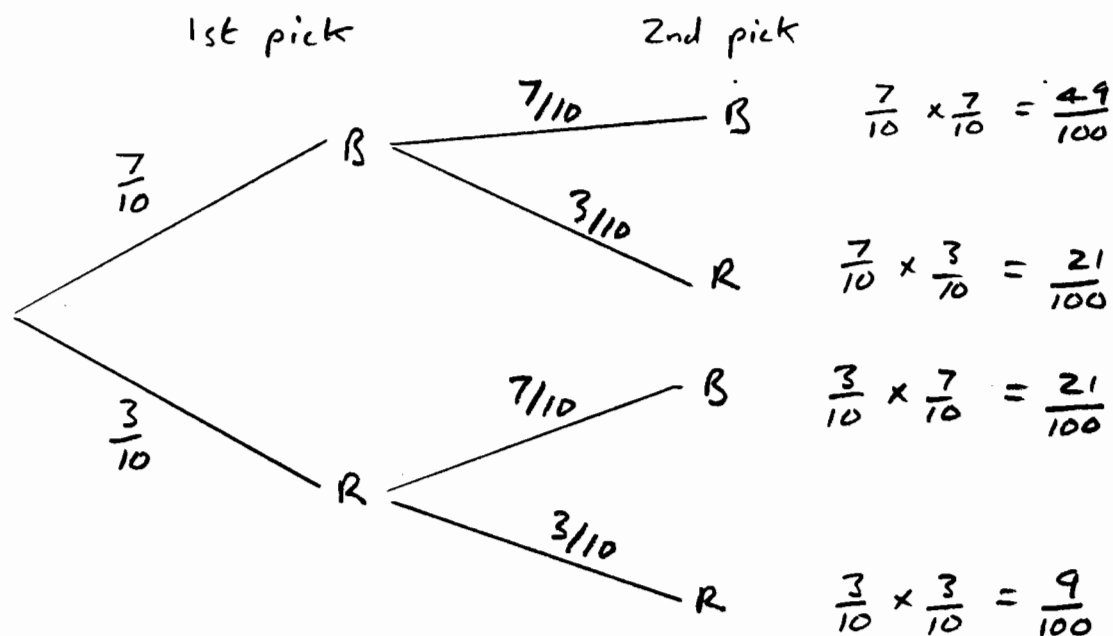
- a) The probability both balls selected are the same colour.
- b) The probability at least one of the balls is red.

This last question is an example of conditional probability where the out come of one event affects the probability of another.

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PROBABILITY TREESEXERCISE

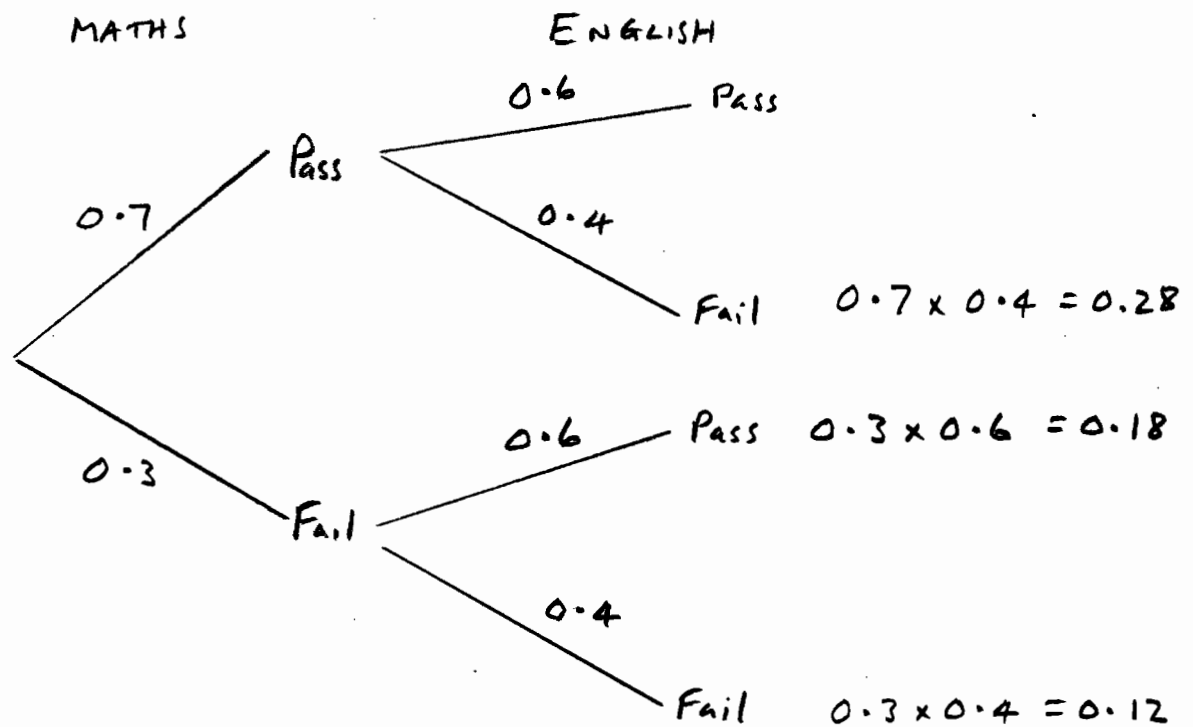
1. 7 blue balls 3 red balls so 10 in total



- a)  $P(\text{Same colour}) = P(RR) + P(BB)$   
 $= \frac{49}{100} + \frac{9}{100} = \frac{58}{100}$  or 0.58
- b)  $P(\text{At least one red}) = P(RR) + P(RB) + P(BR)$   
 $= \frac{9}{100} + \frac{21}{100} + \frac{21}{100}$   
 $= \frac{51}{100}$  or 0.51
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PROBABILITY TREESEXERCISE

2.  $P(\text{Pass Maths}) = 0.7$  ,  $P(\text{Pass English}) = 0.6$



a)  $P(\text{Fails both exams}) = 0.12$

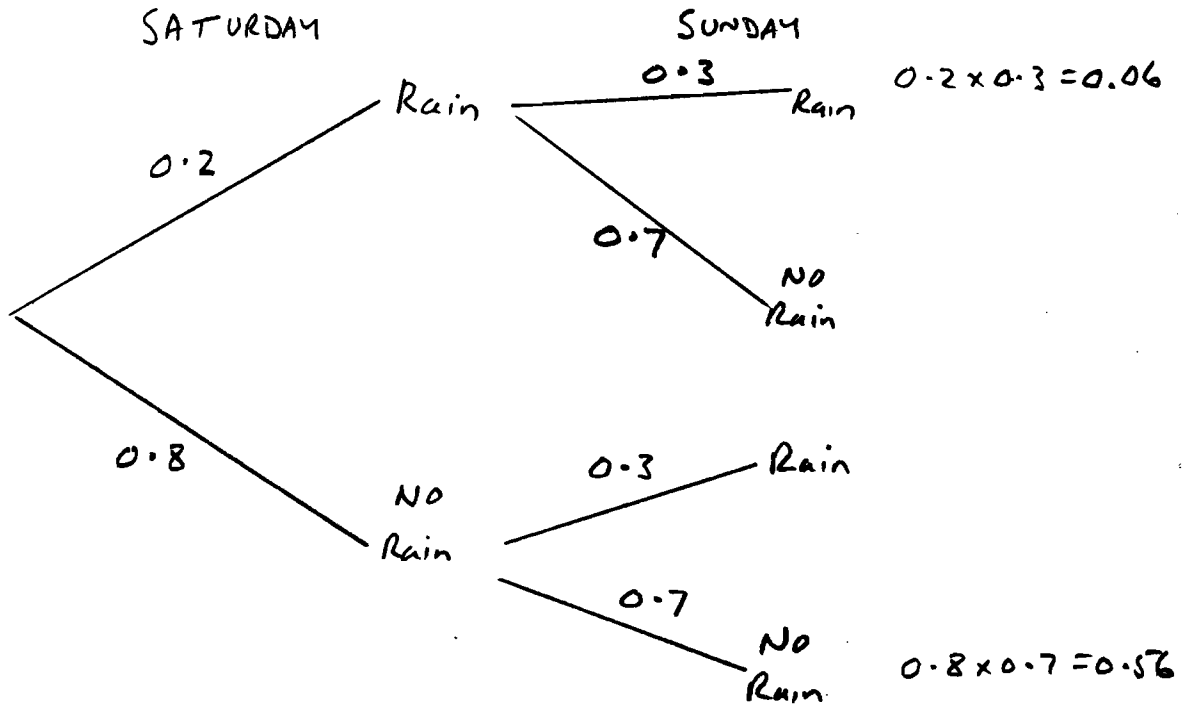
b)  $P(\text{Passes exactly one}) = P(\text{Pass, Fail}) + P(\text{Fail, Pass})$   
 $= 0.28 + 0.18$   
 $= 0.46$

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PROBABILITY TREES

EXERCISE

3.  $P(\text{Rain Saturday}) = 0.2$  ,  $P(\text{Rain Sunday}) = 0.3$



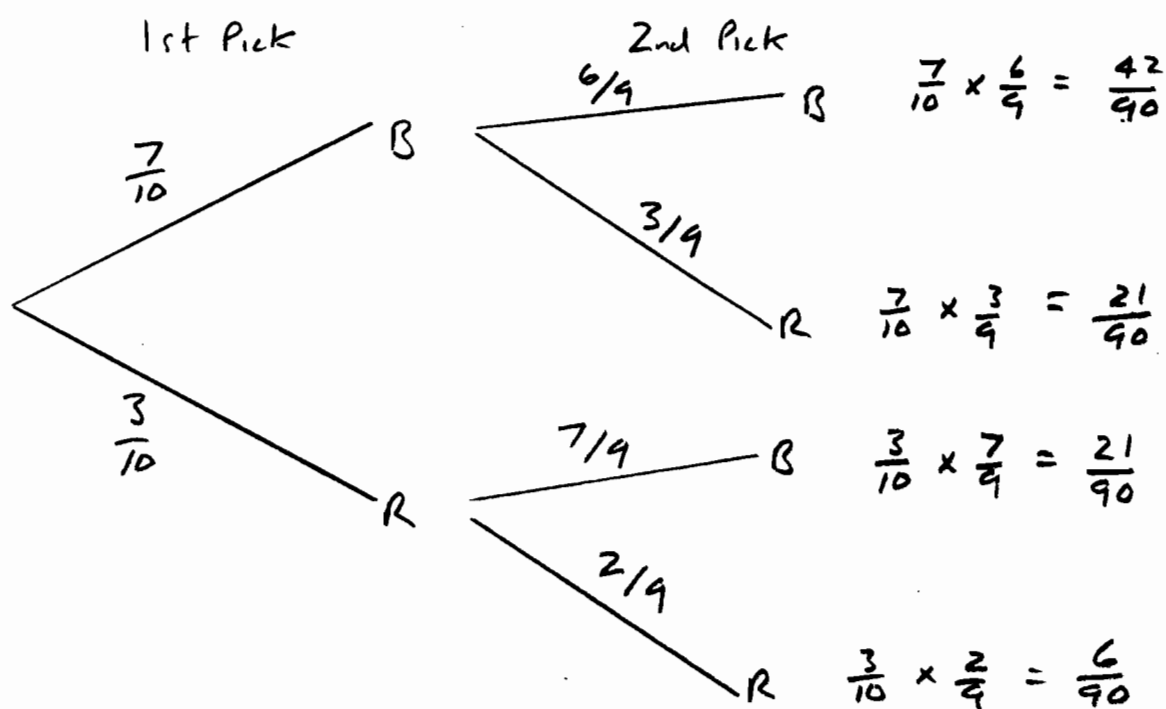
a)  $P(\text{No rain all weekend}) = 0.56$

b)  $P(\text{Rains both days}) = 0.06$

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PROBABILITY TREESEXERCISE

7 blue, 3 red, no replacement



$$a) P(\text{Both same colour}) = P(BB) + P(RR)$$

$$= \frac{42}{90} + \frac{6}{90}$$

$$= \frac{48}{90} \quad \text{or} \quad \frac{8}{15}$$

$$b) P(\text{At least one red}) = P(RR) + P(BR) + P(RB)$$

$$= \frac{6}{90} + \frac{21}{90} + \frac{21}{90}$$

$$= \frac{48}{90} \quad \text{or} \quad \frac{8}{15}$$