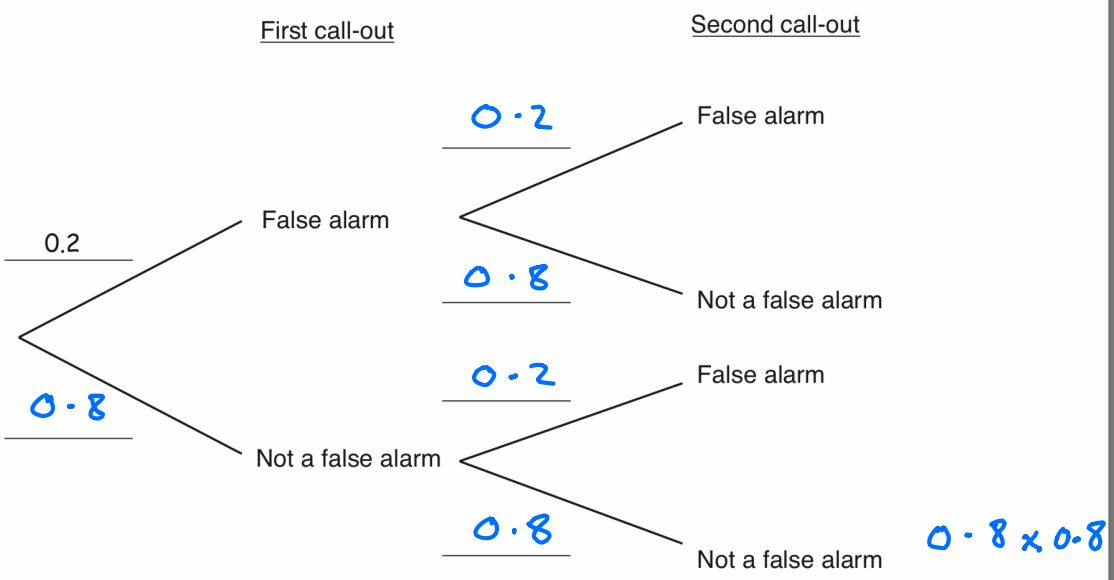
Probability Trees - Exam Questions

15 A fire station manager knows that the probability that any call-out is a false alarm is 0.2.

(a) Complete the tree diagram for the next two call-outs.



[2]

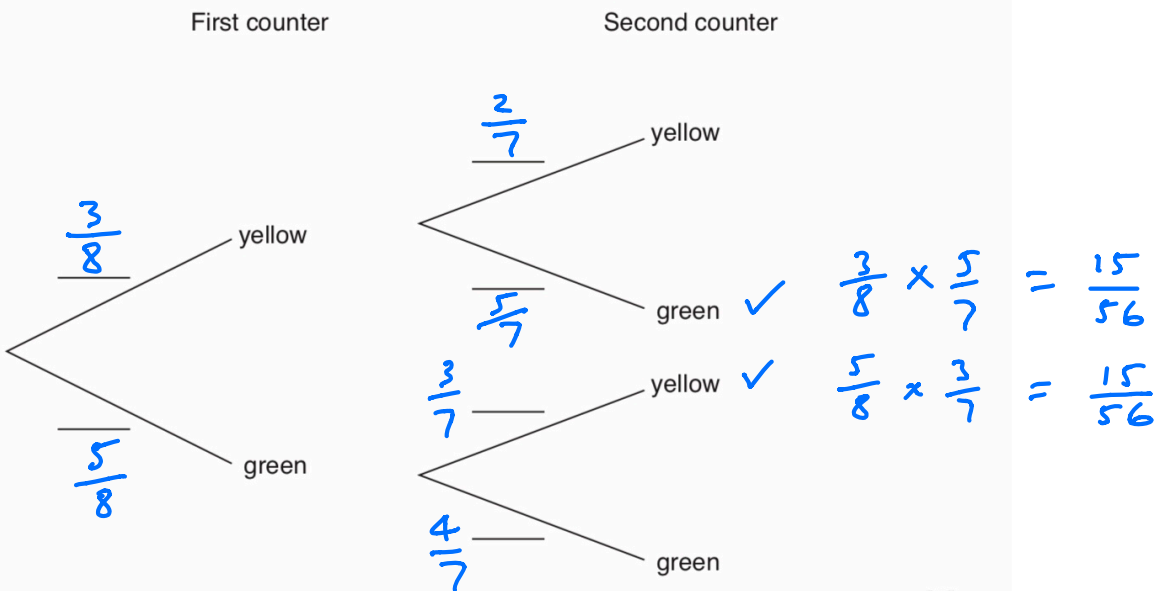
(b) Work out the probability that both of the next two call-outs are **not** false alarms.

0.8 x 0.8 = 0.64

.....

18 A bag contains 3 yellow counters and 5 green counters.
A counter is taken at random from the bag and is not replaced.
A second counter is then taken at random from the bag.

(a) Complete the tree diagram to show the probabilities of taking yellow and green counters.



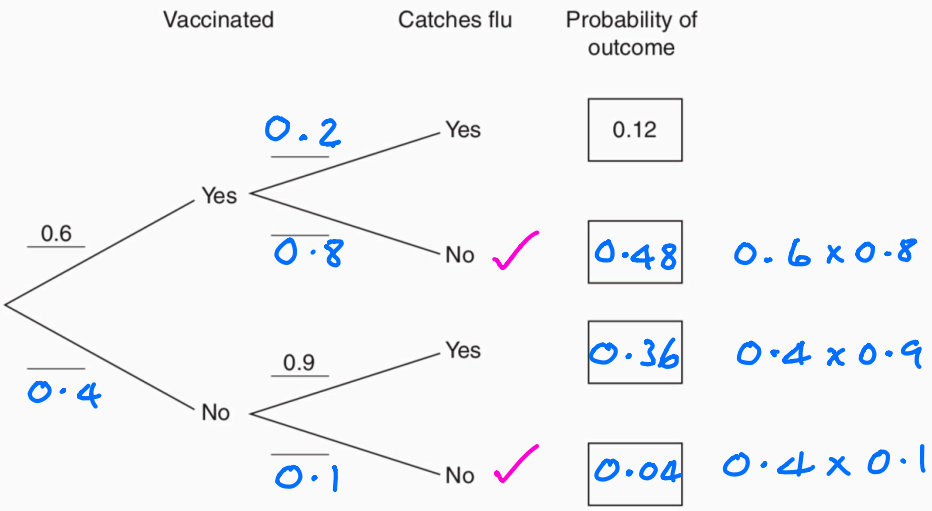
[3]

(b) Work out the probability that the counters taken are different colours.

15/56 + 15/56 = 30/56

23 60% of people in a village are vaccinated against flu.
The probability that a person in the village is vaccinated **and** catches flu is 0.12.
The probability that a person in the village who is not vaccinated catches flu is 0.9.

(a) Complete the tree diagram and fill in the boxes showing the probability of each possible outcome.



[3]

(b) Work out the probability that a person in the village, chosen at random, does not catch flu.

0.48 + 0.04 = 0.52

(b) _____ **[2]**

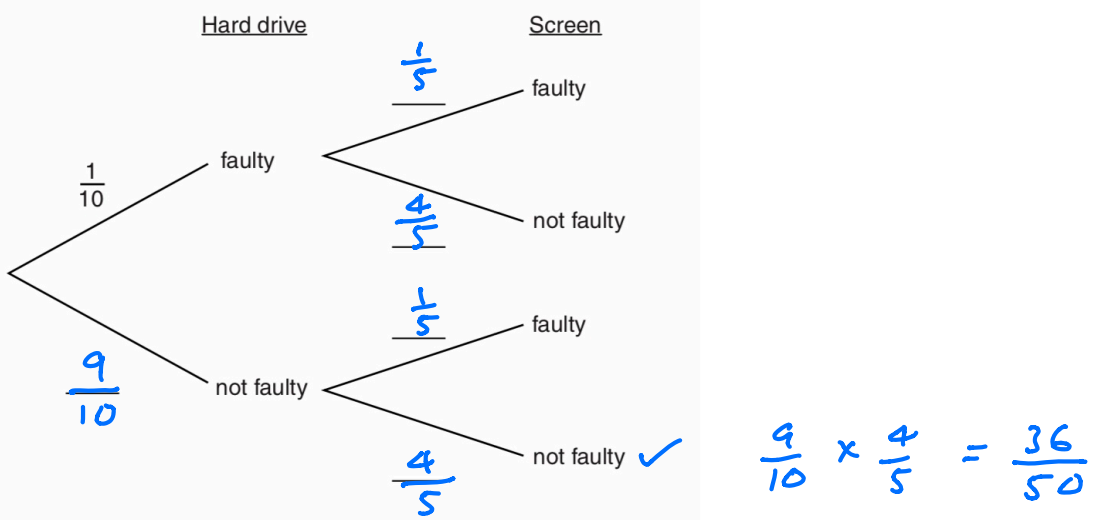
10 Amir sells laptops.
Before selling each laptop, he checks the hard drive and the screen.

The probability that the hard drive is faulty is $\frac{1}{10}$.

The probability that the screen is faulty is $\frac{1}{5}$.

These probabilities are independent.

(a) Complete the tree diagram to represent this information.



9/10 x 4/5 = 36/50

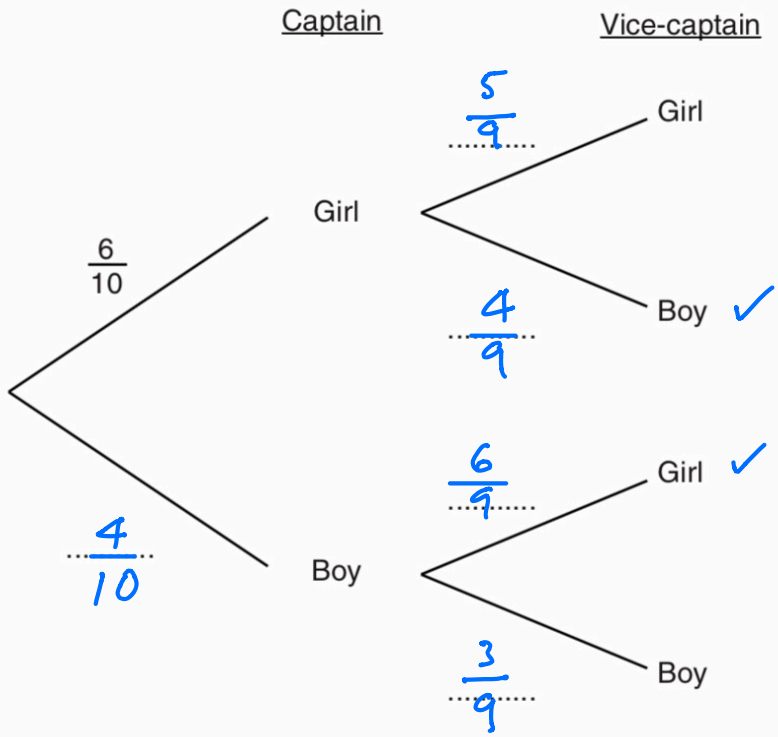
(b) Amir tests a laptop at random.

Find the probability that both the hard drive and the screen are **not** faulty.

36/50

16 A class is selecting a captain and a vice-captain.
Ten students, 6 girls and 4 boys, volunteer.
The ten names are put into a bag and drawn at random.

(a) Complete the tree diagram.



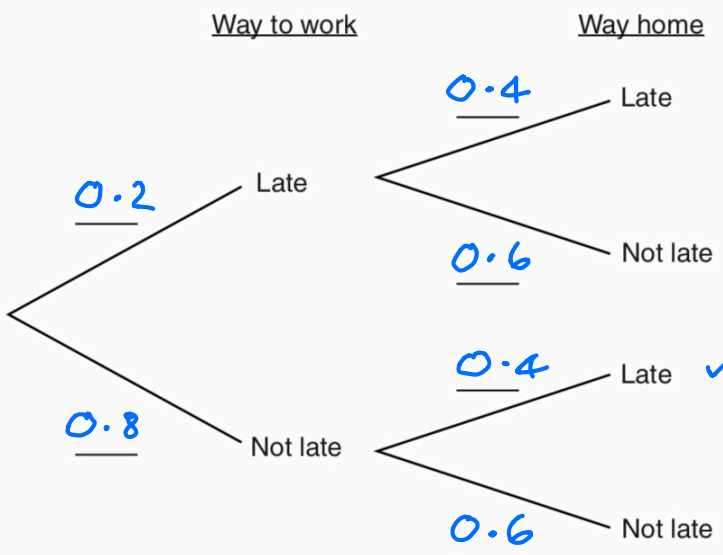
$\frac{6}{10} \times \frac{4}{9} = \frac{24}{90}$ ✓

$\frac{4}{10} \times \frac{6}{9} = \frac{24}{90}$ ✓

(b) Calculate the probability that one of them is a girl and the other is a boy. $\frac{24}{90} + \frac{24}{90} = \frac{48}{90}$

12 Carlos travels to work and back home each day by bus.
The probability that the bus is late on the way to work is 0.2.
The probability that the bus is late on the way home is 0.4.
These events are independent.

(a) Complete the tree diagram to represent this information.



$0.2 \times 0.6 = 0.12$

$0.8 \times 0.4 = 0.32$ ✓

[2]

(b) Calculate the probability that on one particular day only one of the buses that Carlos travels on is late.

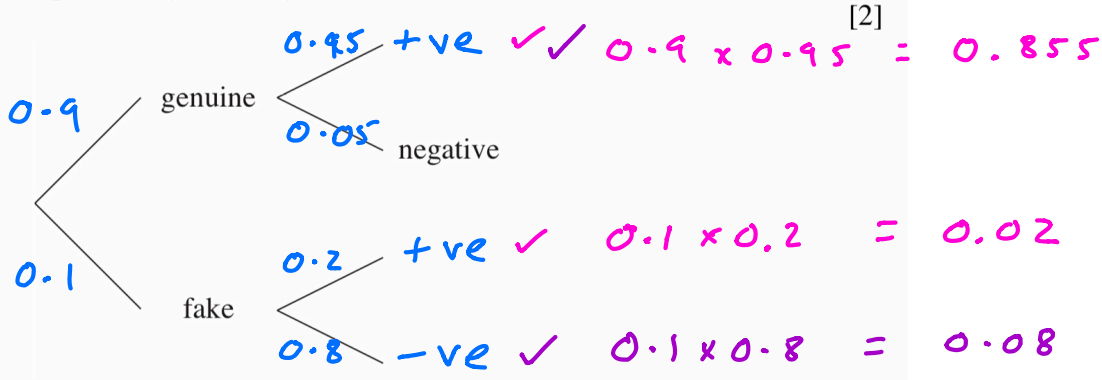
$0.12 + 0.32 = 0.44$

6 It has been estimated that 90% of paintings offered for sale at a particular auction house are genuine, and that the other 10% are fakes. The auction house has a test to determine whether or not a given painting is genuine. If this test gives a positive result, it suggests that the painting is genuine. A negative result suggests that the painting is a fake.

If a painting is genuine, the probability that the test result is positive is 0.95.

If a painting is a fake, the probability that the test result is positive is 0.2.

(i) Copy and complete the probability tree diagram below, to illustrate the information above. [2]



0.9 × 0.95 = 0.855 ✓✓

0.1 × 0.2 = 0.02 ✓

0.1 × 0.8 = 0.08 ✓

Calculate the probabilities of the following events.

(ii) The test gives a positive result. 0.855 + 0.02 = 0.875 [2]

(iii) The test gives a correct result. 0.855 + 0.08 = 0.935 [2]

(iv) ~~The painting is genuine, given a positive result.~~ [3]