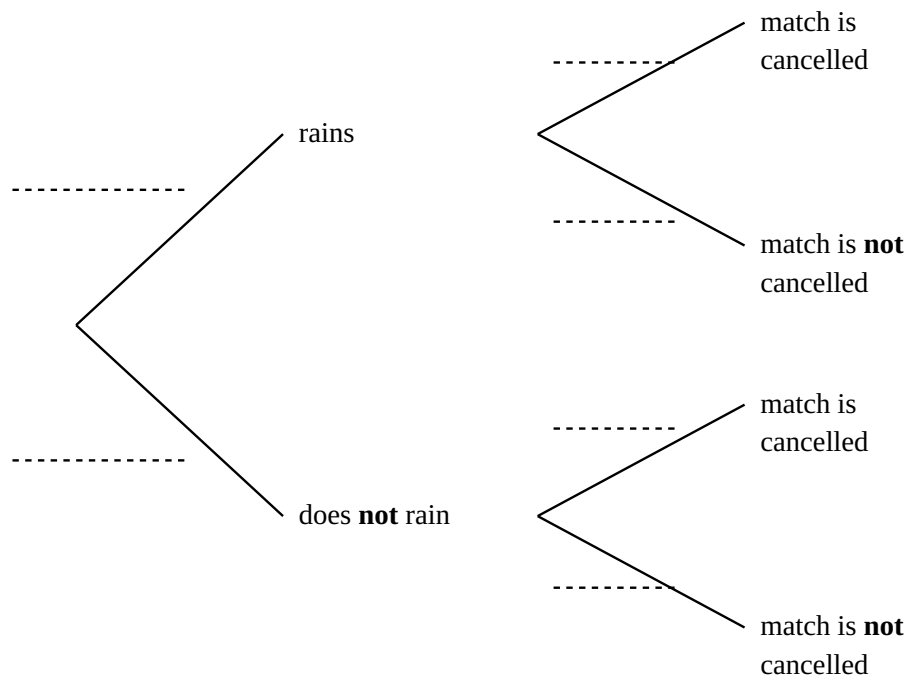

PROBABILITY: TREE DIAGRAMS**Best Guess Mastery Worksheet (Target Grade 4/5)****I Do**

11. The probability that it will rain on a day in August is 0.35.

When it rains, the probability that my cricket match is cancelled is 0.8.

When it does not rain, the probability that my cricket match is not cancelled is 0.9.

(a) Complete the probability tree diagram for this information.



(b) Work out the probability that, on a day in August, my cricket match is cancelled.

PROBABILITY: TREE DIAGRAMS**Best Guess Mastery Worksheet (Target Grade 4/5)****We Do**

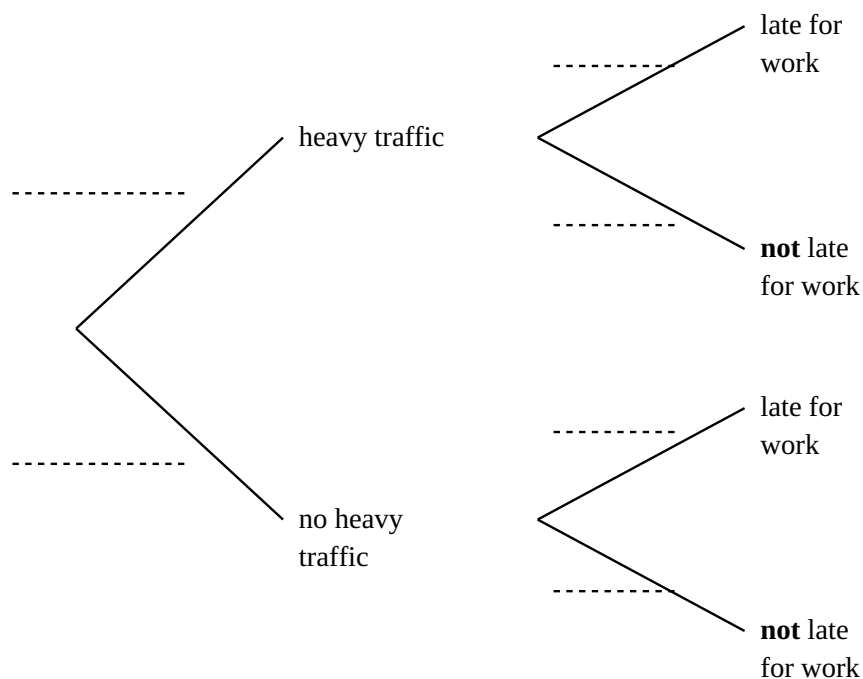
Tom drives to work every morning.

The probability he hits heavy traffic is 0.45.

When he hits heavy traffic, the probability he is late for work is 0.85.

When he does not hit heavy traffic, the probability he is not late for work is 0.95.

(a) Complete the probability tree diagram for this information.



(b) Work out the probability that, on a randomly chosen morning, Tom is late for work.

PROBABILITY: TREE DIAGRAMS**Best Guess Mastery Worksheet (Target Grade 4/5)****You Do 1**

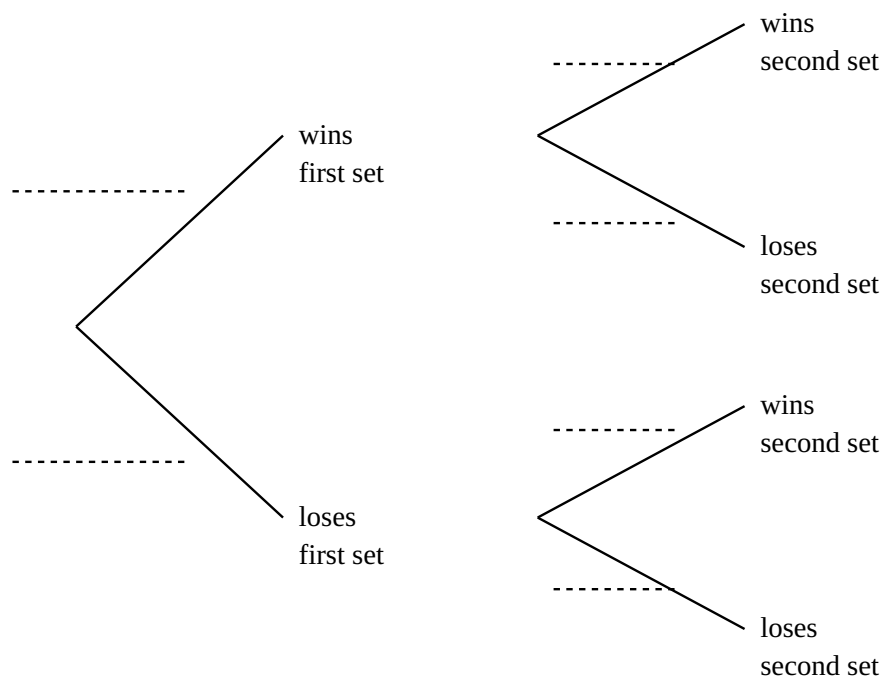
Emily plays a two-set tennis match.

The probability she wins the first set is 0.6.

When she wins the first set, the probability she wins the second set is 0.75.

When she loses the first set, the probability she loses the second set is 0.8.

(a) Complete the probability tree diagram for this information.



(b) Work out the probability that Emily wins the second set.

PROBABILITY: TREE DIAGRAMS**Best Guess Mastery Worksheet (Target Grade 4/5)**

You Do 2

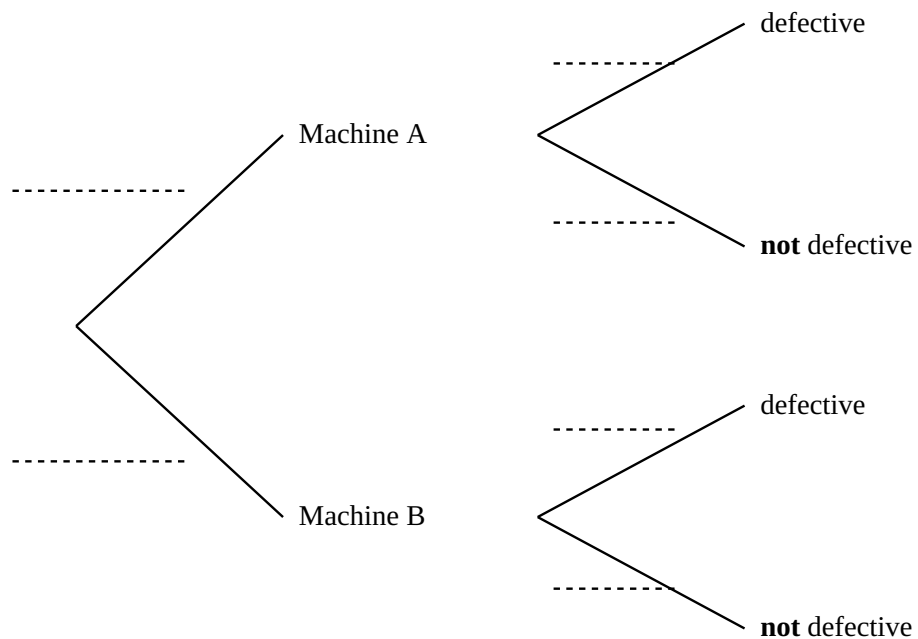
A factory produces components using two machines.

Machine A produces 60% of the components. The remaining components are produced by Machine B.

The probability that a component from Machine A is defective is 0.05.

The probability that a component from Machine B is not defective is 0.92.

(a) Complete the probability tree diagram for this information.



(b) Work out the probability that a randomly chosen component is defective.

PROBABILITY: ALGEBRAIC TREE DIAGRAMS**Best Guess Mastery Worksheet (Target Grade 4/5)**

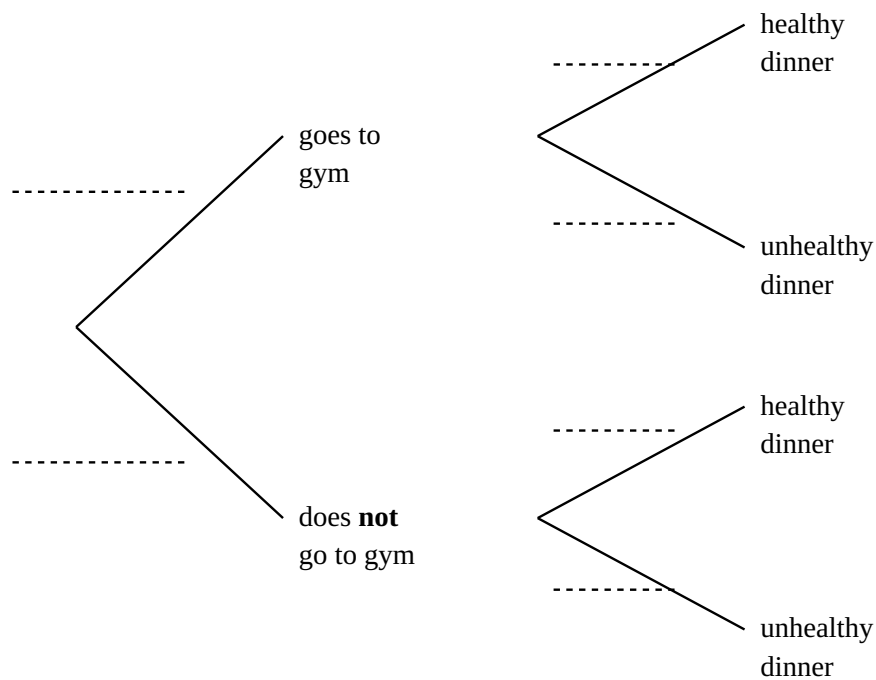
Challenge 1

The probability that John goes to the gym on Saturday is 0.4.

When he goes to the gym, the probability he eats a healthy dinner is 0.9.

When he does not go to the gym, the probability he eats a healthy dinner is p .

(a) Complete the probability tree diagram for this information in terms of p .



The overall probability that John eats a healthy dinner on Saturday is 0.6.

(b) Work out the value of p .

PROBABILITY: CONDITIONAL PROBABILITY**Best Guess Mastery Worksheet (Target Grade 4/5)**

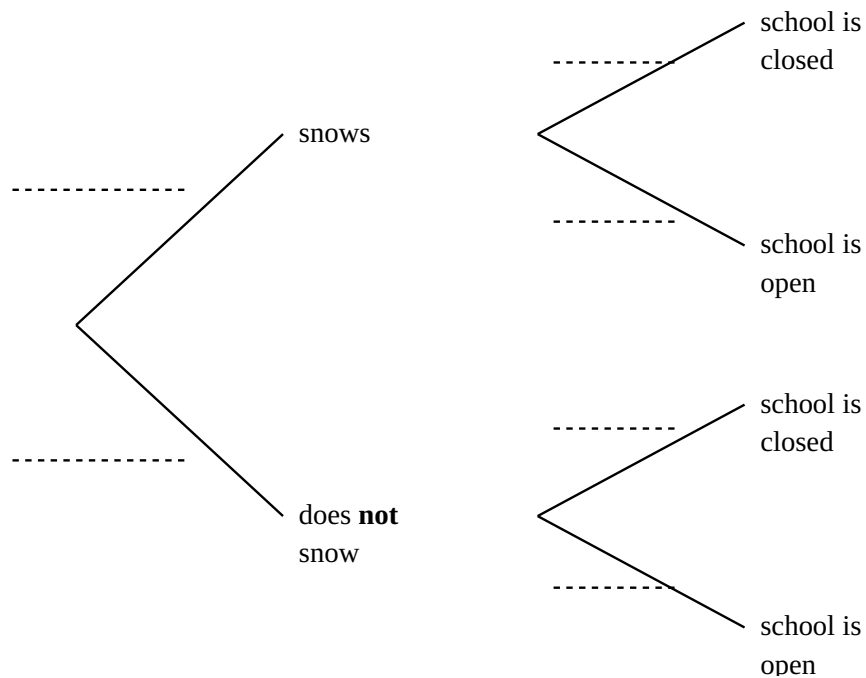
Challenge 2

The probability it snows on Monday is 0.2.

When it snows, the probability the school is closed is 0.8.

When it does not snow, the probability the school is closed is 0.05.

(a) Complete the probability tree diagram for this information.



(b) Given that the school is closed, work out the probability that it snowed on Monday.

Answers & Worked Solutions

I Do:

(a) Tree branches: Rains = 0.35, Does not rain = 0.65.

Top pair: Cancelled = 0.8, Not cancelled = 0.2.

Bottom pair: Cancelled = 0.1, Not cancelled = 0.9.

(b) $P(\text{Cancelled}) = P(\text{Rains and Cancelled}) + P(\text{No Rain and Cancelled})$

$$= (0.35 \times 0.8) + (0.65 \times 0.1)$$

$$= 0.28 + 0.065 = \mathbf{0.345}$$

We Do:

(a) Tree branches: Heavy traffic = 0.45, No heavy traffic = 0.55.

Top pair: Late = 0.85, Not late = 0.15.

Bottom pair: Late = 0.05, Not late = 0.95.

(b) $P(\text{Late}) = P(\text{Traffic and Late}) + P(\text{No traffic and Late})$

$$= (0.45 \times 0.85) + (0.55 \times 0.05)$$

$$= 0.3825 + 0.0275 = \mathbf{0.41}$$

You Do 1:

(a) Tree branches: Wins 1st = 0.6, Loses 1st = 0.4.

Top pair: Wins 2nd = 0.75, Loses 2nd = 0.25.

Bottom pair: Wins 2nd = 0.2, Loses 2nd = 0.8.

(b) $P(\text{Wins 2nd}) = P(\text{Wins 1st and Wins 2nd}) + P(\text{Loses 1st and Wins 2nd})$

$$= (0.6 \times 0.75) + (0.4 \times 0.2)$$

$$= 0.45 + 0.08 = \mathbf{0.53}$$

You Do 2:

(a) Tree branches: Machine A = 0.6, Machine B = 0.4 (since A is 60%).

Top pair (A): Defective = 0.05, Not defective = 0.95.

Bottom pair (B): Defective = 0.08 (since $1 - 0.92$), Not defective = 0.92.

(b) $P(\text{Defective}) = (0.6 \times 0.05) + (0.4 \times 0.08)$

$$= 0.03 + 0.032 = \mathbf{0.062}$$

Challenge 1:

(a) Tree branches: Gym = 0.4, No gym = 0.6.

Top pair: Healthy = 0.9, Unhealthy = 0.1.

Bottom pair: Healthy = p , Unhealthy = $1 - p$.

(b) Overall $P(\text{Healthy}) = (0.4 \times 0.9) + (0.6 \times p) = 0.6$

$$0.36 + 0.6p = 0.6$$

$$0.6p = 0.24 \rightarrow p = 0.24 \div 0.6 = \mathbf{0.4}$$

Challenge 2:

(a) Tree branches: Snows = 0.2, Does not snow = 0.8.

Top pair: Closed = 0.8, Open = 0.2.

Bottom pair: Closed = 0.05, Open = 0.95.

(b) Conditional Probability: $P(\text{Snows} \mid \text{Closed}) = P(\text{Snows and Closed}) \div P(\text{Closed})$

$$P(\text{Closed}) = (0.2 \times 0.8) + (0.8 \times 0.05) = 0.16 + 0.04 = 0.20.$$

$$P(\text{Snows and Closed}) = 0.2 \times 0.8 = 0.16.$$

$$P(\text{Snows} \mid \text{Closed}) = 0.16 \div 0.20 = \mathbf{0.8} \text{ (or } 4/5\text{)}$$