A-Level Starter Activity

Jotwa Maths

Topic: Tree Diagrams

Chapter Reference: Statistics 1, Chapter 5

7 minutes

1. A manufacturer carried out a survey of the defects in their soft toys. It is found that the probability of a toy having poor stitching is 0.03 and that a toy with poor stitching has probability of 0.7 of splitting open. A toy without poor stitching has a probability of 0.02 of splitting open.

a. Draw a tree diagram to represent this information. **(3)**
b. Find the probability that a randomly chosen soft toy has exactly one of the two defects, poor stitching or splitting open. **(3)**

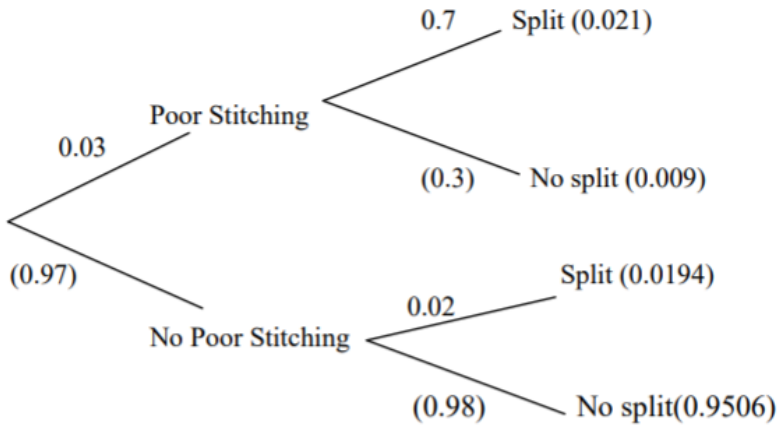
The manufacturer also finds that soft toys can become faded with probability 0.05 and that this defects is independent of poor stitching or splitting open. A soft toy is chosen at random.

c. Find the probability that the soft toy has none of these 3 defects. **(2)**

d. Find the probability that the soft toy have exactly one of these 3 defects. **(4)**

Solutions

1a.



Shape	**M1**
Labels and 0.03	**M1**
Labels, 0.7 and 0.02	**M1**

1b.

P(Exactly one defect) = 0.03 x 0.3 + 0.97 x 0.02	**M1**
= 0.009 + 0.0194	**M1**
= 0.0284	**M1**

1c.

P(No defects) = (1 – 0.03) x (1 – 0.02) x (1 – 0.05)	**M1**
= 0.90307… = 0.903	**M1**

1d.

P(Exactly one defect) = (b) x (1 – 0.05) + (1 – 0.03) x (1 – 0.02) x 0.05	**M1**
= 0.0284 x 0.95 + 0.97 x 0.98 x 0.05	**M1**
= 0.07451..	**M1**
= 0.0745	**M1**