S5 holiday package. 2025

Os e-learning platform.

Principal mathematics. (PROBABILITY)

**ITEM 1.**

You're a student who's landed an internship at a bulb manufacturing company during your Term 2 holiday. As part of the quality control team, you've been tasked with analyzing the production data to determine the likelihood of certain events occurring when a bulb is randomly selected from the production line.

The company produces bulbs using three machines, A, B, and C, with production ratios of 30% for A, 60% for B, and 10% for C. Each machine produces bulbs with different coloration rates: 25% of bulbs from machine A are colored, 30% from machine B are colored, and 70% from machine C are colored.

**Task**.

Your team lead asks you to help ascertain chances of the following events:

   (i)    A randomly selected bulb is not colored
   (ii)   A colored bulb is produced by machine **B**
   (iii)  provide insights into the production process.

   Expected responses.
   i)     0.675
   ii)    0.554
   iii)   <>%

**Item 2**

John is a commuter who travels to work using different modes of transportation, including cars, bikes, and buses. Based on his past experiences, the likelihood of him using these modes of transportation are 50% for cars,1/6 for bikes, and 1/3 for buses.

However, John's punctuality is affected by the mode of transportation he chooses. When he drives a car, the likelihood of being late is 3/8. When he rides a bike, the chance of being late increases to 4/5. On the other hand, when he takes the bus, the likelihood of being late is relatively low at 1/8

John's manager wants to understand his commute patterns and the likelihood of him being late for work. Specifically, the manager wants to know:

   (a) The overall chance that John is late for work on any given day.
   (b) If he randomly selectes120 days are selected, what could be the chance that John will be late on at least 70 days but fewer than 85 days?.

Unfortunately the manager lucks enough mathematics to analyse this information and he has tasked you as the school's top student of mathematics.

Task.

Help the manager

Expected response.

a) 87/240

b)....item bank available.

Happy holiday.

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