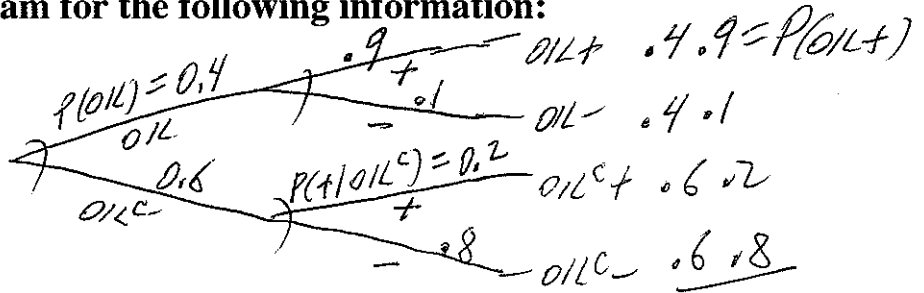


Q1 351-005

1. Make a complete tree diagram for the following information:

- $P(\text{OIL}) = 0.4$
- $P(+ | \text{OIL}) = 0.9$
- $P(+ | \text{no OIL}) = 0.2$



Identify events like OIL+ in the tree and their probabilities (don't reduce). 1 TOTAL

2. From your tree determine

- a. $P(- | \text{no OIL}) = 1 - P(+ | \text{OIL}^c) = 1 - 0.2 = 0.8$
- b. $P(+) = P(\text{OIL}+) + P(\text{OIL}^c+) = 0.4 \cdot 0.9 + 0.6 \cdot 0.2$
- c. $P(\text{OIL} | +) = \frac{P(\text{OIL}+)}{P(+)} = \frac{0.4 \cdot 0.9}{0.4 \cdot 0.9 + 0.6 \cdot 0.2}$

3. If events A, B are independent and satisfy

$P(A) = 0.6 \quad P(B) = 0.3$

- a. $P(AB) = \overset{\text{INDEP}}{P(A)P(B)} = 0.6 \cdot 0.3$ ~~NOTE~~ $P(A|B) = P(A)P(B|A)$
- b. $P(A \cup B) = P(A) + P(B) - P(AB) = 0.6 + 0.3 - 0.6 \cdot 0.3$
- c. $P(B | A) = \overset{\text{INDEP}}{P(B)} = 0.3$

4. A random equal probability sample of $n = 100$ has

$\bar{x} = 25.4 \quad s = 10.6$

- a. Margin of error for sample mean = $1.96 \frac{s}{\sqrt{n}} = 1.96 \frac{10.6}{\sqrt{100}}$
- b. Around what percentage of the time will the population mean μ be covered by the sample interval $\bar{x} \pm$ margin of error? $\approx 95\%$

5. Calculate the sample sd s for the following data (don't reduce)

- a. $\{0, 0, 1\}$ (in terms of \hat{p}) $\sqrt{\frac{n}{n-1}} \sqrt{\hat{p}\hat{q}} = \sqrt{\frac{3}{2}} \sqrt{\frac{1}{3} \cdot \frac{2}{3}}$ SAME AS $\sqrt{\frac{\sum (x_i - \bar{x})^2}{n-1}}$
- b. $\{5, 7, 9\}$ $= \sqrt{\frac{(5-7)^2 + (7-7)^2 + (9-7)^2}{3-1}}$
 $\bar{x} = 7$