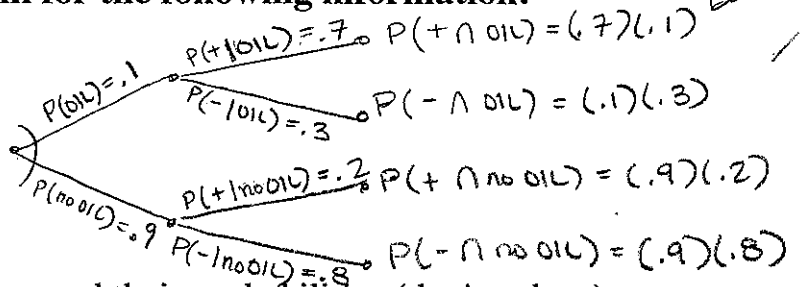


1. Make a complete tree diagram for the following information:

- $P(\text{OIL}) = 0.1$
- $P(+ | \text{OIL}) = 0.7$
- $P(+ | \text{no OIL}) = 0.2$



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

2. From your tree determine

a. $P(- | \text{no OIL}) = .8$

b. $P(+) = P(+ \cap \text{OIL}) + P(+ \cap \text{no OIL}) = (.7)(.1) + (.9)(.2)$

c. $P(\text{OIL} | +) = \frac{P(\text{OIL} \cap +)}{P(+)} = \frac{(.7)(.1)}{[(.7)(.1) + (.9)(.2)]}$

3. If events A, B satisfy

$P(A) = 0.7 \quad P(B) = 0.2 \quad P(B | A) = 0.1$

a. $P(AB) = P(A) \cdot P(B|A) = P(A \cap B) = (.7)(.1)$

b. $P(A \cup B) = P(A) + P(B) - P(A \cap B) = P(A) + P(B) - P(A) \cdot P(B|A) = (.7) + (.2) - (.7)(.1)$

c. $P(B^c | A) = 1 - P(B|A) = 1 - .1 = .9$

4. A random equal probability with-repl sample of $n = 400$ has

$\bar{x} = 16.8 \quad s = 12.4$

a. Which interval (method) covers population μ around 68% of time? $= \bar{x} \pm 1.0 \frac{s}{\sqrt{n}}$

16.8 ± 0.62 $16.8 \pm 1.96 \cdot 0.62$ 16.8 ± 0.031 $16.8 \pm 1.96 \times 0.031 = 16.8 \pm .62$

b. Calculate s for the list {6, 10, 14} but do not reduce.

$S = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1}} = \sqrt{\frac{(6 - 10.8)^2 + (10 - 10.8)^2 + (14 - 10.8)^2}{3-1}}$

5. Box {R R R Y Y Y G G G G}. Draws without replacement but with equal probability.

a. $P(R4 | R1 R2 G3)$ (from the relevant box) = $\frac{1}{9}$

b. $P(R2)$ deduced from the total probability and multiplication rules =

$P(R2) = P(R1 R2) + P(R1^c R2)$
 $= P(R1) \cdot P(R2 | R1) + P(R1^c) \cdot P(R2 | R1^c)$
 $= (\frac{3}{12})(\frac{2}{11}) + (\frac{9}{12})(\frac{3}{11})$