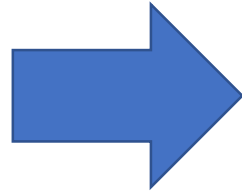# Bayes Theorem

$$P(A|B) = \frac{P(B|A) \times P(A)}{P(B)}$$
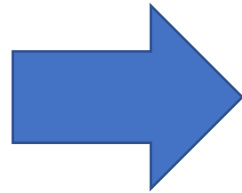
Machine-1
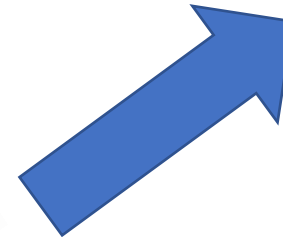
30 Per Hour
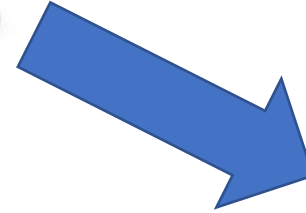
Machine-2

20 Per Hour

1% Defective

50% from Machine-1

50% from Machine-2

QUESTION

What is the probability that a wrench produced by Machine-2 is defective?

→Probability of a wrench that is come from Machine-1:

P(Machine-1) = 30/50 = 0.6 = 60%

→Probability of a wrench that is come from Machine-2:

P(Machine-2) = 20/50 = 0.4 = 40%

→Probability of a wrench of being defective:

P(Defective) = 1% = 0.01

→Probability of being a wrench from Machine-1 from the defective pile:

P(M1|Defect) = 50% = 0.5

→Probability of being a wrench from Machine-2 from the defective pile:

P(M2|Defect) = 50% = 0.5

QUESTION

What is the probability that a wrench produced by Machine-2 is defective?
P(Defect|Machine-2) = ?

$$P(Defect|Machine2) = \frac{P(Machine2|Defective) \times P(Defective)}{P(Machine2)}$$

$$= \frac{0.5 \times 0.01}{0.4} = 0.0125 = 1.25\%$$