Important Formulas of Probability PDF



List of 21 Important Formulas of Probability

Evaluate Formula

Evaluate Formula 🕝

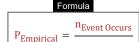
Evaluate Formula 🕝

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Evaluate Formula (

Evaluate Formula 🕝

1) Empirical Probability Formula C



Example $0.7 = \frac{14}{20}$

2) Odds against Formula

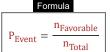


 $O_A = \frac{n_L}{n_W} \mid 0.6667 = \frac{8}{12}$

3) Odds in Favor Formula 🕝



4) Probability of Event Formula C



5) Probability of Failure Formula C



 $q = \frac{n_L}{n_W + n_L} \left| \quad \right| \ 0.4 = \frac{8}{12 + 8}$

6) Probability of Success Formula C



 $p_{BD} = \frac{n_W}{n_W + n_L} \left| \quad \right| \ 0.6 = \frac{12}{12 + 8}$



7) Probability of Two or More Events Formulas

7.1) Probability of All Independent Events Occurring Formula C

Formula $P_{(A \cap B \cap C)} = P_{(A)} \cdot P_{(B)} \cdot P_{(C)}$

Example $0.08 = 0.5 \cdot 0.2 \cdot 0.8$ Evaluate Formula

7.2) Probability of Atleast One Event Occurring Formula C

Evaluate Formula 🕝

Evaluate Formula

Evaluate Formula C

Evaluate Formula

Formula $P_{(A \cup B \cup C)} = P_{(A)} + P_{(B)} + P_{(C)} - P_{(A \cap B)} - P_{(B \cap C)} - P_{(A \cap C)} + P_{(A \cap B \cap C)}$

Example

0.92 = 0.5 + 0.2 + 0.8 - 0.1 - 0.16 - 0.4 + 0.08

7.3) Probability of Atleast Two Events Occurring Formula C

 $P_{\text{(Atleast Two)}} = \left(P_{\text{(A)}} \cdot P_{\text{(B)}}\right) + \left(P_{\text{(A')}} \cdot P_{\text{(B)}} \cdot P_{\text{(C)}}\right) + \left(P_{\text{(A)}} \cdot P_{\text{(B')}} \cdot P_{\text{(C)}}\right)$

Example $0.5 = (0.5 \cdot 0.2) + (0.5 \cdot 0.2 \cdot 0.8) + (0.5 \cdot 0.8 \cdot 0.8)$

7.4) Probability of Dependent Events A and B Occurring Together Formula

 $P_{(A \cap B)} = P_{(A)} \cdot P_{(B|A)}$ $0.1 = 0.5 \cdot 0.2$

7.5) Probability of Event A Not Occurring Formula C

Formula Example $P_{(A')} = 1 - P_{(A)}$ 0.5 = 1 - 0.5

Evaluate Formula

7.6) Probability of Event A Occurring given Event B occurs Formula [7]

 $P_{(A|B)} = \frac{P_{(A\cap B)}}{P_{(B)}} \mid 0.5 = \frac{0.1}{0.2}$

7.7) Probability of Event A Occurring given Event B occurs using Baye's Theorem Formula C Evaluate Formula

 $P_{(A|B)} = \frac{P_{(B|A)} \cdot P_{(A)}}{P_{(B)}}$ $0.5 = \frac{0.2 \cdot 0.5}{0.2}$

7.8) Probability of Event A or B Occurring Formula C

Formula Example
$$P_{(A \cup B)} = P_{(A)} + P_{(B)} - P_{(A \cap B)}$$
 $0.6 = 0.5 + 0.2 - 0.1$

Evaluate Formula 🕝

7.9) Probability of Event A or B Occurring but Not Together Formula C

 $P_{(A\Delta B)} = P_{(A)} + P_{(B)} - (2 \cdot P_{(A \cap B)})$ $0.5 = 0.5 + 0.2 - (2 \cdot 0.1)$

Evaluate Formula

7.10) Probability of Exactly One Event Occurring Formula 🕝

Formula

Evaluate Formula 🕝

 $P_{\text{(Exactly One)}} = \left(P_{\text{(A)}} \cdot P_{\text{(B')}} \cdot P_{\text{(C')}}\right) + \left(P_{\text{(A')}} \cdot P_{\text{(B)}} \cdot P_{\text{(C')}}\right) + \left(P_{\text{(A')}} \cdot P_{\text{(B')}} \cdot P_{\text{(C)}}\right)$

 $0.42 = (0.5 \cdot 0.8 \cdot 0.2) + (0.5 \cdot 0.2 \cdot 0.2) + (0.5 \cdot 0.8 \cdot 0.8)$

7.11) Probability of Exactly Two Events Occurring Formula

Formula

 $P_{\text{(Exactly Two)}} = \left(P_{\text{(A')}} \cdot P_{\text{(B)}} \cdot P_{\text{(C)}}\right) + \left(P_{\text{(A)}} \cdot P_{\text{(B')}} \cdot P_{\text{(C)}}\right) + \left(P_{\text{(A)}} \cdot P_{\text{(B)}} \cdot P_{\text{(C')}}\right)$

 $0.42 = (0.5 \cdot 0.2 \cdot 0.8) + (0.5 \cdot 0.8 \cdot 0.8) + (0.5 \cdot 0.2 \cdot 0.2)$

7.12) Probability of Independent Events A and B Occurring Together Formula C

 $P_{(A \cap B)} = P_{(A)} \cdot P_{(B)} | 0.1 = 0.5 \cdot 0.2$

Evaluate Formula (

Evaluate Formula

7.13) Probability of Mutually Exclusive Events A or B Occurring Formula 🕝

 $P_{(A \cup B)} = P_{(A)} + P_{(B)}$ 0.7 = 0.5 + 0.2

Example

EvaluateFormula 🕝

7.14) Probability of Neither of Events A or B Occurring Formula C

Formula

Evaluate Formula (

 $P_{((A \cup B)')} = 1 - (P_{(A)} + P_{(B)} - P_{(A \cap B)}) | 0.4 = 1 - (0.5 + 0.2 - 0.1)$

7.15) Probability of None of Events Occurring Formula

Formula

Evaluate Formula 🕝

$$P_{\left(\left(A \cup B \cup C\right)'\right)} = 1 \cdot \left(P_{\left(A\right)} + P_{\left(B\right)} + P_{\left(C\right)} \cdot \left(P_{\left(A\right)} \cdot P_{\left(B\right)}\right) \cdot \left(P_{\left(B\right)} \cdot P_{\left(C\right)}\right) \cdot \left(P_{\left(C\right)} \cdot P_{\left(A\right)}\right) + \left(P_{\left(A\right)} \cdot P_{\left(B\right)} \cdot P_{\left(C\right)}\right)\right)$$

Example

 $0.08 = 1 - (0.5 + 0.2 + 0.8 - (0.5 \cdot 0.2) - (0.2 \cdot 0.8) - (0.8 \cdot 0.5) + (0.5 \cdot 0.2 \cdot 0.8))$

Variables used in list of Important Formulas of Probability above

- n_{Event Occurs} Number of Times Event Occurs
- n_{Favorable} Number of Favorable Outcomes
- n_I Number of Losses
- n_{Total Trials} Total Number of Trials
- **n**_{Total} Total Number of Outcomes
- n_W Number of Wins
- O_▲ Odds Against
- O_F Odds in Favor
- P_{((A∪B)')} Probability of Non-Occurrence of Event A and B
- P_{((A∪B∪C)')} Probability of Non Occurrence of Any Event
- P(A) Probability of Event A
- P(A') Probability of Non-Occurrence of Event A
- P(AIB) Probability of Event A given Event B Occurs
- P(A∩B) Probability of Occurrence of Event A and Event B
- P(A∩B∩C) Probability of Occurrence of All Three Events
- P(ACC) Probability of Occurrence of Event A and Event C
- P(AUB) Probability of Occurrence of Event A or Event B
- P(AUBUC) Probability of Occurrence of Atleast One Event
- P(Atleast Two) Probability of Occurrence of Atleast Two Events
- P_(AΔB) Probability of Event A or B but Not Together
- P_(B) Probability of Event B
- P_(B') Probability of Non-Occurrence of Event B
- P_(BIA) Probability of Event B given Event A Occurs
- P(BOC) Probability of Occurrence of Event B and Event C
- P(C) Probability of Event C
- P_(C') Probability of Non-Occurrence of Event C
- P(Exactly One) Probability of Occurrence of Exactly One Event
- P(Exactly Two) Probability of Occurrence of Exactly Two Events
- PBD Probability of Success in Binomial Distribution
- P_{Empirical} Empirical Probability
- P_{Event} Probability of Event
- · q Probability of Failure



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Mixed fraction

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