

P12 - 2.4 - In/Dependent Die/Cards Notes

Roll a Die Twice (6 sided) Independent - Not dependent on previous Events.

$$P(6,2) = P(6)P(2) = \frac{1}{6} \times \frac{1}{6} = \frac{1}{36}$$

$$P(2,6) = P(6)P(2) = \frac{1}{6} \times \frac{1}{6} = \frac{1}{36}$$

$$P(6) = \frac{1}{6} \quad P(2|6) = \frac{1}{6} \quad P(2) = \frac{1}{6} \quad P(6|2) = \frac{1}{6}$$

$$P(6 \cap 2) = P(6,2) + P(2,6)$$

$$P(6 \cap 2) = \frac{1}{36} + \frac{1}{36} = \frac{2}{36} = \frac{1}{18}$$

Pick two cards (Standard Deck) $P(1H) = ?$ W/Replacement Independent

13 Hearts
52 Total

$\frac{13}{52} \xrightarrow{H}$ $\frac{13}{52} \times \frac{13}{52} = \frac{169}{2704}$ $P(H,H) = \frac{169}{2704}$

$\frac{13}{52} \xrightarrow{H}$ $\frac{39}{52} \xrightarrow{\bar{H}}$ $\frac{13}{52} \times \frac{39}{52} = \frac{507}{2704}$ $P(H, \bar{H}) = \frac{507}{2704}$

$\frac{39}{52} \xrightarrow{\bar{H}}$ $\frac{13}{52} \xrightarrow{H}$ $\frac{39}{52} \times \frac{13}{52} = \frac{507}{2704}$ $P(\bar{H}, H) = \frac{507}{2704}$

$\frac{39}{52} \xrightarrow{\bar{H}}$ $\frac{39}{52} \xrightarrow{\bar{H}}$ $\frac{39}{52} \times \frac{39}{52} = \frac{1521}{2704}$ $P(\bar{H}, \bar{H}) = \frac{1521}{2704}$

39 Diamonds
Clubs
Spades

Dependent : Dependant of previous Events.

W/out Replacement

$P(B|A) \neq P(B)$

Sections Add to 1*

$$\frac{2}{3} \xrightarrow{A} \frac{2}{3} + \frac{1}{3} = 1$$

$\frac{1}{3} \xrightarrow{\bar{A}}$

Denominators in a vertical line are the same*

$$P(1H) = P(H, \bar{H}) + P(\bar{H}, H)$$

$$P(1H) = \frac{507}{2704} + \frac{507}{2704}$$

$$P(1H) = \frac{1014}{2704}$$

$$P(H \geq 1) = 1 - P(0H)$$

$$= 1 - \frac{1521}{2704} = \frac{1183}{2704}$$

Pick a card. (Standard Deck) let q = queen let h = heart

$$p(q) = \frac{4}{52} \quad p(h) = \frac{13}{52} \quad p(q \cap h) = \frac{1}{52}$$

$$p(q \cup h) = p(q) + p(h) - p(q \cap h)$$

$$p(q \cup h) = \frac{4}{52} + \frac{13}{52} - \frac{1}{52}$$

$$p(q \cup h) = \frac{16}{52}$$

Pick a card. (Standard Deck) let J = Jack let a = Ace

$$P(J) = \frac{4}{52} \quad \text{w/rep} \quad P(J|A) = \frac{4}{52} \quad \text{w/out rep} \quad P(J|A) = \frac{4}{51}$$

Pick two cards (Standard Deck) w/out replacement let F = Face Card Dependent let H = Heart

$$p(F \& H) = \frac{36}{2652} + \frac{117}{2652} = \frac{153}{2652}$$

$p(HF, H) + p(\bar{H}F, H)$