

10.5/10.6 Independent Events/Conditional Probability

*Independent Events: events whose occurrences do not effect each other.

Dependent Events: events whose occurrences effect each other.

P(independent events)

$$P(A \& B) = P(A) \cdot P(B)$$

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$$1. a. P(B \& C) = P(B) \cdot P(C) = .25 \cdot .75 = .1875$$

$$b. P(D \& A) = P(D) \cdot P(A) = .1 \cdot .5 = .05$$

$$2. a. \frac{4}{8} \cdot \frac{4}{8} \cdot \frac{4}{8} = .125$$

$$b. \frac{5}{8} \cdot \frac{3}{8} \cdot \frac{3}{8} = .088$$

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$$3. a. .4 \cdot .6 = .24$$

$$b. .3 \cdot .2 = .06$$

$$c. .2 \cdot .3 \cdot .4 \cdot .6 = .0144$$

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10.6

Conditional Prob: $A \& B$

prob. of event B given that event A has happened or will happen.

$$P(B|A) = \frac{P(A \& B)}{P(A)}$$

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$$1. a. P(\text{yellow first}) = \frac{9}{22}$$

$$P(\text{red second}) = \frac{8}{21}$$

$$P(Y \& R) = \frac{9}{22} \cdot \frac{8}{21} = .1558$$

$$b. P(R \& Y) = \frac{8}{22} \cdot \frac{9}{21} = .1558$$

$$c. P(B \& B) = \frac{5}{22} \cdot \frac{4}{21} = .043$$

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2. A: even
B: 5

$$a. P(A) = \frac{3}{6} = \frac{1}{2}$$

$$b. P(B) = \frac{1}{6}$$

$$c. P(A \& B) = 0$$

$$d. P(B|A) = 0$$

3. A: odd
B: 1 or 3

$$P(A) = \frac{1}{2}$$

$$P(B) = \frac{2}{6} = \frac{1}{3}$$

$$P(A \& B) = \frac{2}{6} = \frac{1}{3}$$

$$P(B|A) = \frac{P(A \& B)}{P(A)} \\ = \frac{\frac{1}{3}}{\frac{1}{2}} = \frac{2}{3}$$

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