

Mutually Exclusive Events:

When two events **CAN'T** happen at the same time.

Not Mutually Exclusive means:

When two events **CAN** happen at the same time.

Probability of Two Events that are Mutually Exclusive Events:

$$P(A \text{ or } B) = P(A) + P(B)$$

$$P(A \text{ and } B) = 0$$

Probability of Two Events that are NOT Mutually Exclusive:

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$P(A \text{ and } B) = P(A) \cdot P(B)$$

A survey of peoples favorite college was conducted. The results are shown below. You will pick a random person. Find each probability as a fraction.

| | MSU | UM | OSU | Total |
|--------|-----|----|-----|-------|
| Male | 47 | 15 | 6 | 68 |
| Female | 33 | 13 | 10 | 56 |
| Total | 80 | 28 | 16 | 124 |

a) $P(\text{UM and OSU}) = \frac{0}{124}$

b) $P(\text{MSU or UM}) = \frac{108}{80 + 28} = \frac{108}{108}$

c) $P(\text{Female and UM}) = \frac{13}{124}$

d) $P(\text{Male or MSU}) = \frac{101}{68 + 80 - 47} = \frac{101}{101}$

Find each probability as a fraction

a) The probability that it snows today = $\frac{1}{100}$ and the probability that my car doesn't start today = $\frac{2}{75}$

Find $P(\text{snows today} \text{ or } \text{car doesn't start}) =$

These two events CAN happen at the same time. Use the following:
 $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

$$\frac{1}{100} + \frac{2}{75} - \frac{1}{100} \cdot \frac{2}{75} = \frac{\frac{75}{7500} + \frac{200}{7500} - \frac{2}{7500}}{7500} = \frac{273}{7500}$$

b) The probability that you score more than 10 points in the basketball game is $\frac{3}{8}$ and the probability that you don't score any points is $\frac{1}{6}$.

Find $P(\text{score} > 10 \text{ points} \text{ or } \text{score} = 0 \text{ points}) =$

$$\frac{3}{8} + \frac{1}{6}$$

These two events CAN'T happen at the same time. Use the following:

$$P(A \text{ or } B) = P(A) + P(B)$$

$$= \frac{9}{24} + \frac{4}{24} = \boxed{\frac{13}{24}}$$

c) The probability that a hitter strikes out is 12% and the probability that they get a hit is 30%. Find the probability that, in their next at bat, the hitter strikes out or gets a hit.

$P(\text{strike out or get a hit}) =$ These two events CAN'T happen at the same time. Use the following:

$$P(A \text{ or } B) = P(A) + P(B)$$

$$12\% + 30\% = 42\%$$

d) The probability that it rains is $\frac{3}{10}$ and the probability that it is cold is $\frac{4}{15}$.

Find the probability that it rains or it is cold.

$P(\text{rains or cold}) =$

These two events CAN happen at the same time. Use the following:

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$\frac{3}{10} + \frac{4}{15} - \frac{3}{10} \cdot \frac{4}{15}$$

$$\frac{45}{150} + \frac{40}{150} - \frac{12}{150} = \boxed{\frac{73}{150}}$$

Hwk #26: Sec 9-7

due Monday

pages 534-535

problems 1-4, 10-13, 36-40