Warm up:

If $f(x) = -4x + 9$ and $g(x) = 2x - 7$, find $(f \circ g)(x)$

$f(g(x))$

input

$-4(2x-7)+9$

$-8x+28+9$

$-8x+37$

Addition Rule 1:

When two events, A and B, are mutually exclusive, the probability that A or B will occur is the sum of the probability of each event.

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

In a game, a six sided number cube is rolled once. What is the probability of getting a number less than 2 or a number divisible by 3?

$\frac{1}{6} + \frac{2}{6} = \frac{3}{6}$ $\frac{1}{2}$

A glass jar contains 1 red, 3 green, 2 blue, and 4 yellow marbles. If a single marble is chosen at random from the jar, what is the probability that it is yellow or green?

$\frac{4}{10} + \frac{3}{10} = \frac{7}{10}$

Additional Rule 2

When two events, A and B, are non-mutually exclusive, the probability that A or B will occur is:

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

A single card is chosen at random from a standard deck of 52 playing cards. What is the probability of choosing a king or a club?

$$\frac{4}{52} + \frac{13}{52} - \frac{1}{52} = \frac{16}{52} = \frac{8}{26} = \frac{4}{13}$$

In a math class of 30 students, 17 are boys and 13 are girls. On a unit test, 4 boys and 5 girls made an A grade. If a student is chosen at random from the class, what is the probability of choosing a girl or an A student?

$$\frac{13}{30} + \frac{9}{30} - \frac{5}{30} = \frac{17}{30}$$

Multiplication Rule 1

When two events, A and B, are independent, the probability of both occurring is:

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

A coin is tossed and a number cube is rolled. What is the probability of the coin landing on tails and rolling a 3?

$$\frac{1}{2} \cdot \frac{1}{6} = \frac{1}{12}$$

Multiplication Rule 2

When two events, A and B, are dependent, the probability of both occurring is:

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

The notation used above does not mean that B is divided by A. It means the probability of event B given that event A has already occurred.

In a shipment of 20 computers, 3 are defective. Three computers are randomly selected and tested. What is the probability that all three are defective if the first is defective and second is defective and they are not replaced after being tested?

$\frac{3}{20} \cdot \frac{2}{19} \cdot \frac{1}{18} = \frac{1}{1140}$