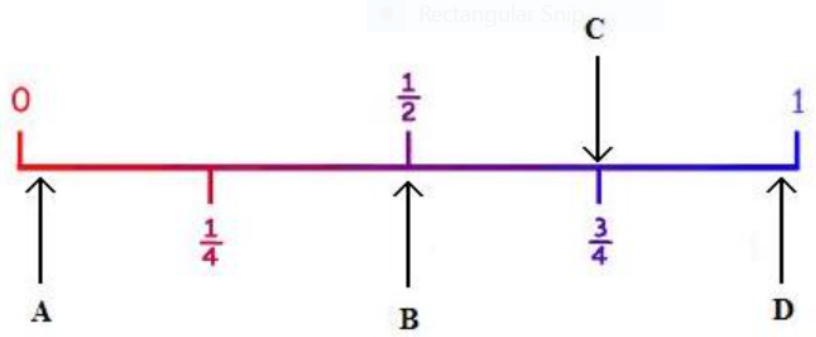
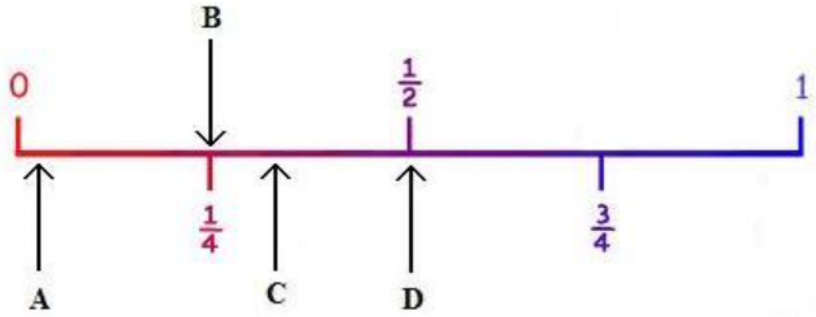
Warm Up 1/4/22

1.



Which of the arrows A, B, C or D shows the best position on the probability line for the event 'Man will one day set foot on Mars'?

2.



A name is chosen at random from the telephone book. Which of the arrows A, B, C or D shows the best position on the probability line for the event 'The name begins with Z'?

Experimental Probability vs. Theoretical Probability

The theoretical probability is what you expect to happen, but it isn't always what actually happens. It uses a formula to show what should happen in a certain event.

The experimental (or empirical) probability is what happens from the results of an experiment. It is what actually happens instead of what you were expecting to happen.

Probability

*How **likely** something is to happen.*

Many events can't be predicted with total certainty. The best we can say is how **likely** they are to happen, using the idea of probability.

Tossing a Coin

When a coin is tossed, there are two possible outcomes:

- heads (H) or
- tails (T)

We say that the probability of the coin landing **H** is ½.

And the probability of the coin landing **T** is ½.

$P(\mathbf{T}) = \frac{1}{2}$

Throwing Dice

When a single die is thrown, there are six possible outcomes: **1, 2, 3, 4, 5, 6**.

The probability of any one of them is 1/6.

$$\mathbf{P(1) = \frac{1}{6}}$$

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

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

$$\mathbf{P(4) = \frac{1}{6}}$$

$$\mathbf{P(5) = \frac{1}{6}}$$

$$\mathbf{P(6) = \frac{1}{6}}$$

The sum of all the probabilities is **1**

For any experiment:

The sum of the probabilities of **all** possible outcomes is always equal to **1**

Probability

In general:

$$\text{Probability of an event happening} = \frac{\text{Number of ways it can happen}}{\text{Total number of outcomes}}$$

$$\text{P}(E) = \text{Probability of Event } E = \frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$$

Example: the chances of rolling a "4" with a die

Number of ways it can happen: 1 (there is only 1 face with a "4" on it)

Total number of outcomes: 6 (there are 6 faces altogether)

$$\text{So the probability} = \frac{1}{6}$$

Example: there are 5 marbles in a bag: 4 are blue, and 1 is red. What is the probability that a blue marble gets picked?

Number of ways it can happen: 4 (there are 4 blues)

Total number of outcomes: 5 (there are 5 marbles in total)

$$\text{So the probability} = \frac{4}{5} = 0.8$$