Finding Theoretical Probability

Theoretical Probability of an Event	The likelihood that an event with occur; the ratio of the number of favorable outcomes to the total number of possible outcomes	$P(A) = \dfrac{\text{\# of outcomes}}{\text{total \# of possible outcomes}}$

Examples

A bag contains 2 yellow, 3 green, 4 blue and 3 red marbles. A marble is drawn at random.

1. Find the probability of drawing a green marble.

   Answer: $\dfrac{3\ green}{12\ total\ marbles} = \dfrac{1}{4} = 0.25 = 25\%$

2. Find the probability of drawing a blue marble.

   Answer: $\dfrac{4\ blue}{12\ total\ marbles} = \dfrac{1}{3} \approx 0.333 \approx 33.3\%$

3. Find the probability of drawing a marble that is not red.

   Answer: $\dfrac{9\ nonred\ marbles}{12\ total\ marbles} = \dfrac{3}{4} = 0.75 = 75\%$

Try These

Find the following theoretical probabilities. Write your answer as a fraction (in simplest form), a decimal and a percent.

A letter is selected at random from the word $probability$.

4. Find the probability that the letter is a consonant.   _____

5. Find the probability that the letter is a b.   _____

A normal six-sided cube is rolled.

6. Find the probability that the number is divisible by 3.   _____

7. Find the probability that the number is odd.   _____

8. Find the probability that the number is not a 5.   _____

# When the Boy Tire Maker Married the Girl Tire Maker, What Did Everyone Say?

Do each exercise and find your answer at the bottom of the page. Write the letter of the exercise in the box above the answer.

1. Suppose you roll a regular 6-faced die.

(A) How many equally likely outcomes are there?

(E) If you roll the die once, what is the probability of rolling a 3?

(H) If you roll the die 60 times, about how many times would you expect to get a 1?

(I) If you roll the die 300 times, about how many times would you expect to get a 5?

2. A spinner is shown at the right for which each outcome is **not** equally likely.
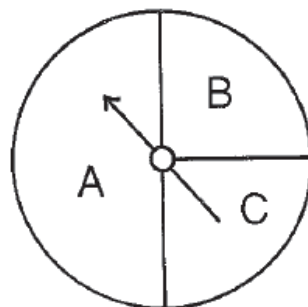
(E) If you spin the spinner once, what is the probability that it will stop on A?

(A) If you spin the spinner once, what is the probability that it will stop on B?

(T) If you spin the spinner 50 times, about how many times would you expect it to stop on A?

(Y) If you spin the spinner 80 times, about how many times would you expect it to stop on C?

3. Find each probability if you choose one marble at random.

(E) P(black)   (S) P(striped)

(A) P(not black)   (E) P(not white)

(R) P(black or white) (M) P(yellow)
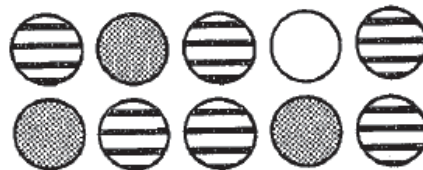
4. Solve.

(N) If you flip a coin 150 times, about how many times would you expect to get heads?

(C) The letters a, e, i, o, u, and y are vowels. If one letter of the alphabet is chosen at random, what is the probability it is a vowel?

(K) If you randomly pick a date in April, how many equally likely outcomes are there?

(P) A magician asks you to pick a card, any card, from a standard deck of 52 cards. What is the probability of picking an ace?

| 25 | 10 | $\frac{9}{10}$ | 20 | $\frac{1}{8}$ | 0 | 6 | 30 | $\frac{1}{2}$ | $\frac{2}{13}$ | $\frac{7}{10}$ | $\frac{1}{5}$ | 75 | 50 | $\frac{3}{13}$ | $\frac{1}{6}$ | 32 | $\frac{3}{5}$ | $\frac{1}{13}$ | $\frac{1}{4}$ | $\frac{2}{5}$ | $\frac{3}{10}$ |