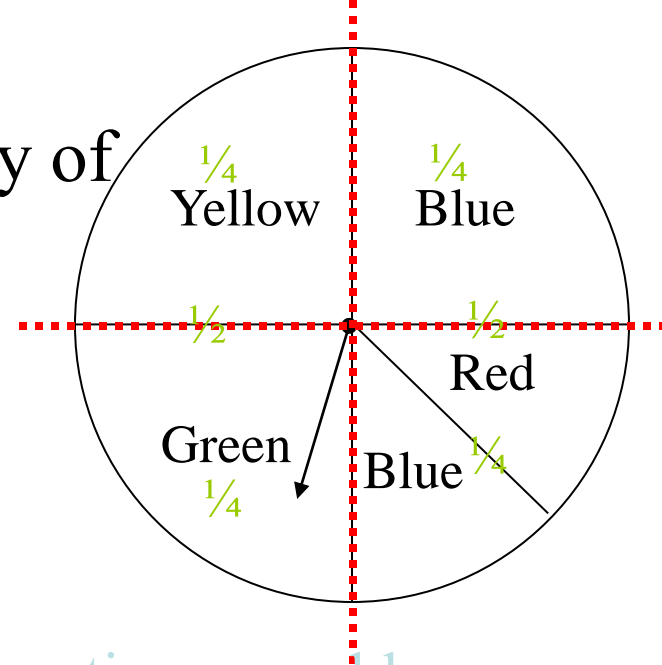




8.7 Making Predictions

Objective - To use experimental and theoretical probability to make predictions.

What is the theoretical probability of spinning a yellow?



The probability of spinning a yellow is $\frac{1}{4}$...because $\frac{1}{4}$ of the spinner is yellow.

If you would spin the spinner 100 times how many times would you expect to get yellow?

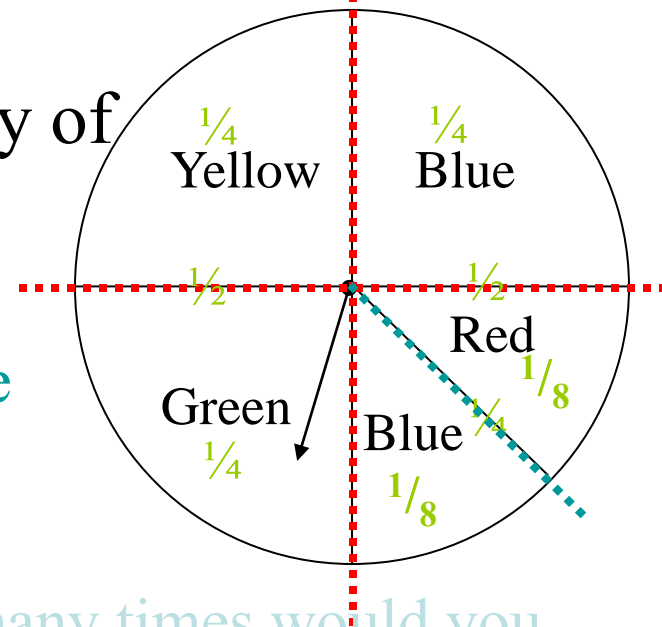
$\frac{1}{4}$ ← Number of times spinning yellow
 $\frac{1}{4}$ ← Total number of times spinning

So... $\frac{1}{4} \times 25 = \frac{25}{100}$

If you spin the spinner 100 times you would expect to have the result of yellow 25 times.

$$\frac{1}{4} \times 100 = 25$$

What is the theoretical probability of spinning a red



The probability of spinning a red is $\frac{1}{8}$...because $\frac{1}{8}$ of the spinner is red.

If you would spin the spinner 1000 times how many times would you expect to get red?

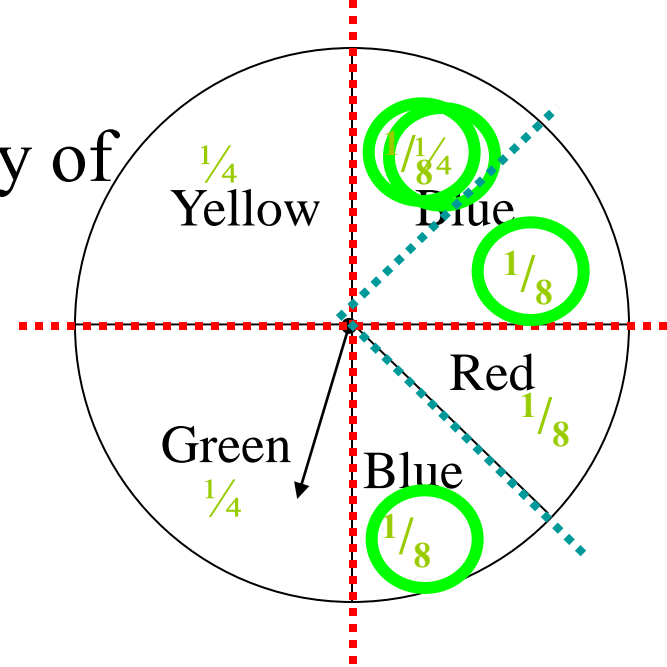
Probability of spinning red is... $\frac{1}{8}$ ← Number of times spinning red
 ← Total number of times spinning

$$\text{So... } \frac{1 \times 125}{8 \times 125} = \frac{125}{1000}$$

If you spin the spinner 1000 times you would expect to have the result of red 125 times.

$$\frac{1}{8} \times 125 = 125$$

What is the theoretical probability of spinning a blue



$$\frac{1}{4} + \frac{1}{8} = \frac{2}{8} + \frac{1}{8} = \frac{3}{8}$$

The probability of spinning a blue is $\frac{3}{8}$...because $\frac{3}{8}$ of the spinner is blue.

If you would spin the spinner 800 times how many times would you expect to get blue?

Probability of spinning blue is... $\frac{3}{8}$ ← Number of times spinning blue

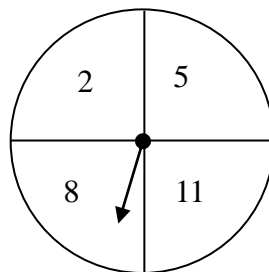
So... $\frac{3 \times 100}{8 \times 100}$ ← Total number of times

$= \frac{300}{800}$ spinning

If you spin the spinner 800 times you would expect to have the result of blue 300 times.

Work in Pairs

- In an experiment Yolanda is rolling a number cube and spinning a spinner with the number 2, 5, 8, and 11. She then finds the sum of the two results.



Step 1: With your partner create a Tree Diagram that could be used to find all the possible outcomes of this experiment.

Step 2: Then with your partner find the Theoretical Probability of several different events and predict the number of outcomes for that event.

Step 3: Finally show your teacher your solutions to move on to your homework assignment.

Probability



Experimental

A gum company claims 7 out of 8 dentists surveyed favor gum chewing. How many dentists should favor gum chewing out of 50?

$$\frac{7}{8} = \frac{x}{50}$$

$$350 = 8x$$

$$x = 43.75$$

About 44

Theoretical

If you roll a die 80 times, how many times should you expect to roll a 6?

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

$$\frac{1}{6} = \frac{x}{80}$$

$$80 = 6x$$

$$x \approx 13.33$$

About 13

Theoretical Probability

A six sided die is rolled 100 times. Predict how many times a 3 will be rolled?

$$P(\text{of rolling } 3) \cdot 100 = \frac{1}{6} \cdot 100 = \frac{100}{6} = 16.\bar{6}$$

About 17 times.

A six sided die is rolled 200 times. Predict how many times a prime number will be rolled?

$$P(\text{of prime number}) \cdot 200 = \frac{3}{6} \cdot 200 = \frac{600}{6} = \underline{100}$$

You roll two dice 300 times. Estimate the number of times a sum of seven will be rolled?

+	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

$$P(\text{of sum of } 7) \cdot 300 = \frac{6}{36} \cdot 300 = \frac{1}{6} \cdot 300 = 50$$

Experimental Probability

Estimate the number of times the event will occur given the number of trials.

1) Experimental probability: $\frac{3}{4}$ $\frac{3}{4} \cdot \frac{60}{240} = 180$

Number of trials 240

2) Experimental probability: $\frac{2}{5}$ $\frac{2}{5} \cdot \frac{60}{300} = 120$

Number of trials 300

Word Problems

An elite college admits 60% of the students they send acceptance letters to. The other 40% decide to attend other colleges. If the college wants to admit 900 students in its freshman class, how many acceptance letters should they send out?

Let $x = \#$ of acceptance letters

$$60\% \text{ of } x = 900$$

$$\frac{\cancel{60}}{\cancel{100}}x = 900$$

$$6x = 9000$$

$$x = 1500$$

or

$$\frac{60}{100} = \frac{900}{x}$$

$$60x = 90000$$

$$x = 1500$$

Experimental Probability

Marv shoots par or better on 80% of the holes that he plays. If he plays 72 holes over 4 days, how many times should he expect par or better?

Let $x = \#$ of times he gets par or better

80% of 72

$$0.80 \cdot 72 = 57.6$$

About 58 holes.

or

$$\frac{80}{100} = \frac{x}{72}$$

$$5760 = 100x$$

$$x = 57.6$$

About 58 holes.