NAME: _____ DATE: _____

PROBABILITY PERIOD: _____

How Do You Find the Experimental Probability of an Event?

(Topic #4)

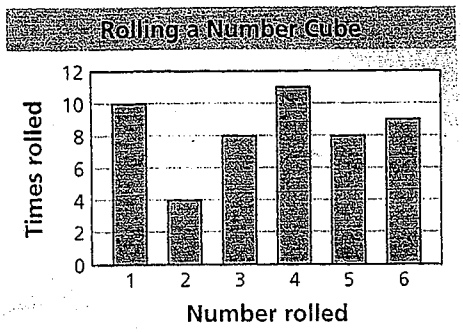
Experimental Probability
Probability that is based on repeated trials of an experiment is called **experimental probability**. $$P(event) = \frac{number\ of\ times\ the\ event\ occurs}{total\ number\ of\ trials}$$

EXAMPLE 1: Finding an Experimental Probability

The bar graph shows the results of rolling a number cube 50 times.

a) What is the experimental probability of rolling an even number?

b) What is the experimental probability of rolling a prime number?



PRACTICE: Read each question carefully. Show your work.

1. Using the graph from Example 1, what is the experimental probability of rolling a number divisible by 3?

EXAMPLE 2: Making a Prediction

It rains 2 out of the last 12 days in March. If this trends continues, how many rainy days would you expect in April? (NOTE: April has 30 days.)

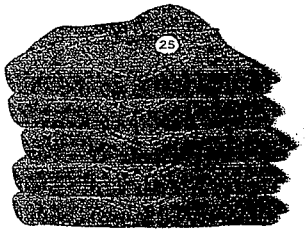
PRACTICE: Read each question carefully. Show your work.

2. There are 30 days in the month of June. It rains 3 out of the last 15 days in May. If this trend continues, how many rainy days would you expect in June?

3. At a clothing company, an inspector finds 5 defective pairs of jeans in a shipment of 200 jeans.

   a) What is the experimental probability of a pair of jeans being defective?

   b) About how many would you expect to be defective in a shipment of 5000 pairs of jeans?



4. Thirteen out of 20 emails in your inbox are junk emails.

   a) What is the experimental probability that your next email is junk?

   b) What is the experimental probability that your next email is *not* junk?

   c) If you received an additional 280 emails, how many would you expect to be junk?

NAME: _____ DATE: _____

PROBABILITY PERIOD: _____

HOMEWORK - (Topic #4)

Finding the Experimental Probability of an Event

1. Describe how to find the experimental probability of an event.

2. If you flip a coin 10 times and find the experimental probability of flipping tails to be 0.7. Does this seem reasonable? Explain.

You have three sticks. Each stick has one red side and one blue side. You throw the sticks ten times and record the results. Use the table to find the experimental probability of the event.

Outcome	Frequency
3 red	4
3 blue	0
2 blue, 1 red	2
2 red, 1 blue	4

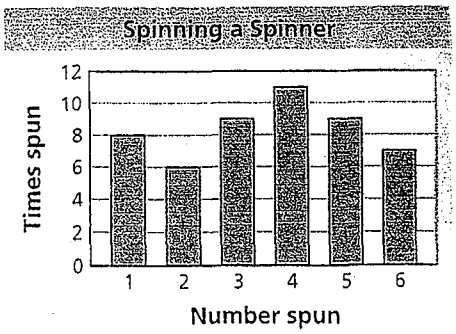
3. P (3 red) _____

4. P (2 blue, 1 red) _____

5. P (2 red, 1 blue) _____

6. P (*not* all red) _____

Use the bar graph to find the experimental probability of the event.



7. Spinning a 6 _____

8. Spinning an even number _____

9. *Not* spinning a 1 _____

10. Spinning a number less than 3 _____

11. Spinning a 1 or a 3 _____

12. Spinning a 7 _____

13. You check 20 cartons of eggs. Three of the cartons have at least one cracked egg. What is the experimental probability that a carton of eggs has at least one cracked egg?

14. There are 105 lettered tiles in a board game. You choose an R, A, M, E, I, L, and B. How many of the 105 tiles would you expect to be vowels?

15. An inspector estimates that $\frac{1}{2}$ % of MP3 players are defective. In a shipment of 5000 MP3 players, predict the number that are defective.

16. During a 24-hour period, the ratio of pop songs played to rap songs played on a radio station is 60:75.

    a) What is the experimental probability that the next song played is rap?

    b) Out of the next 90 songs, how many would you expect to be pop?

NAME: KEY DATE: _____

PROBABILITY PERIOD: _____

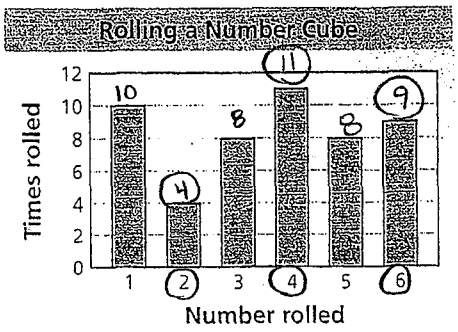
How Do You Find the Experimental Probability of an Event?

(Topic #4)

Experimental Probability
Probability that is based on repeated trials of an experiment is called **experimental probability**. $$P(event) = \frac{number\ of\ times\ the\ event\ occurs}{total\ number\ of\ trials}$$

EXAMPLE 1: Finding an Experimental Probability

The bar graph shows the results of rolling a number cube 50 times.



a) What is the experimental probability of rolling an even number?

$$exp\ P(even) = \frac{24}{50} = \frac{12}{25}$$

b) What is the experimental probability of rolling a prime number?

$$exp\ P(prime\ \#) = \frac{20}{50} = \frac{2}{5}$$

PRACTICE: Read each question carefully. Show your work.

1. Using the graph from Example 1, what is the experimental probability of rolling a number divisible by 3?

$$exp\ P(\#\ divisible\ by\ 3) = \frac{17}{50}$$

EXAMPLE 2: Making a Prediction

It rains 2 out of the last 12 days in March. If this trends continues, how many rainy days would you expect in April? (NOTE: April has 30 days.)

$$\left(\frac{rain}{total}\right) \quad \frac{2}{12} = \frac{x}{30}$$

$$12x = 2(30)$$

$$\frac{12x}{12} = \frac{60}{12}$$

$$x = 5$$

We would expect 5 rainy days in April.

PRACTICE: Read each question carefully. Show your work.

2. There are 30 days in the month of June. It rains 3 out of the last 15 days in May. If this trend continues, how many rainy days would you expect in June?

$\left(\frac{\text{rain}}{\text{total}}\right)$ $\frac{3}{15} = \frac{x}{30}$

$15x = 3(30)$

$\frac{15x}{15} = \frac{90}{15}$

$x = 6$

We would expect it to rain 6 days in June.

3. At a clothing company, an inspector finds 5 defective pairs of jeans in a shipment of 200 jeans.

a) What is the experimental probability of a pair of jeans being defective?

$\text{exp } P(\text{defective}) = \frac{5}{200} = \frac{1}{40}$ or 2.5%

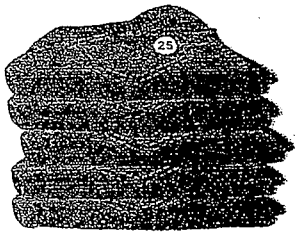
b) About how many would you expect to be defective in a shipment of 5000 pairs of jeans?

$\left(\frac{\text{defective}}{\text{total}}\right)$ $\frac{1}{40} = \frac{x}{5000}$

$\frac{40x}{40} = \frac{5000}{40}$

$x = 125$

About 125 jeans would be defective in a shipment of 5000 pairs of jeans.



4. Thirteen out of 20 emails in your inbox are junk emails.

a) What is the experimental probability that your next email is junk?

$\text{exp } P(\text{junk}) = \frac{13}{20}$

b) What is the experimental probability that your next email is *not* junk?

$\text{exp } P(\text{not junk}) = \frac{7}{20}$

c) If you received an additional 280 emails, how many would you expect to be junk?

$\left(\frac{\text{junk}}{\text{total}}\right)$ $\frac{13}{20} = \frac{x}{280}$

$20x = 13(280)$

$\frac{20x}{20} = \frac{3640}{20}$

$x = 182$

About 182 emails would be junk in an additional 280 emails.

NAME: KEY DATE: _____

PROBABILITY PERIOD: _____

HOMEWORK - (Topic #4)

Finding the Experimental Probability of an Event

1. Describe how to find the experimental probability of an event.

- perform an experiment several times
- count how often the event occurs
- divide by the # of trials

2. If you flip a coin 10 times and find the experimental probability of flipping tails to be 0.7. Does this seem reasonable? Explain.

Yes, You could flip tails 7 out of 10 times, but with more trials, the probability of flipping tails should get closer to 0.5 or 50%.

You have three sticks. Each stick has one red side and one blue side. You throw the sticks ten times and record the results. Use the table to find the experimental probability of the event.

Outcome	Frequency
3 red	4
3 blue	0
2 blue, 1 red	2
2 red, 1 blue	4

TOTAL = 10

3. P (3 red) $\frac{4}{10} = \frac{2}{5}$

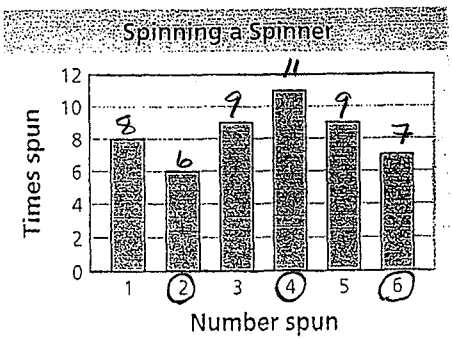
4. P (2 blue, 1 red) $\frac{2}{10} = \frac{1}{5}$

5. P (2 red, 1 blue) $\frac{4}{10} = \frac{2}{5}$

6. P (*not* all red) $\frac{6}{10} = \frac{3}{5}$

2+4+0

Use the bar graph to find the experimental probability of the event.



Total = 50 spins

7. Spinning a 6 $\frac{7}{50}$

8. Spinning an even number $\frac{24}{50} = \frac{12}{25}$

6+11+7

9. *Not* spinning a 1 $\frac{42}{50} = \frac{21}{25}$

6+9+11+9+7

10. Spinning a number less than 3 $\frac{14}{50} = \frac{7}{25}$

8+6

11. Spinning a 1 or a 3 $\frac{17}{50}$

8+9

12. Spinning a 7 0

13. You check 20 cartons of eggs. Three of the cartons have at least one cracked egg. What is the experimental probability that a carton of eggs has at least one cracked egg?

$$\text{exp } P(\text{cracked}) = \frac{3}{20}$$

14. There are 105 lettered tiles in a board game. You choose an R, A, M, E, I, L, and B. How many of the 105 tiles would you expect to be vowels?

$$\left(\frac{\text{vowel}}{\text{total}}\right) \quad \frac{3}{7} = \frac{x}{105}$$

$$7x = 3(105)$$

$$\frac{7x}{7} = \frac{315}{7}$$

$$x = 45$$

15. An inspector estimates that $\frac{1}{2}\%$ of MP3 players are defective. In a shipment of 5000 MP3 players, predict the number that are defective.

$$\frac{1}{2}\% = \frac{\frac{1}{2}}{100}$$

$$\left(\frac{\text{defective}}{\text{total}}\right) \quad \frac{0.5}{100} = \frac{x}{5000}$$

$$100x = 0.5(5000)$$

$$\frac{100x}{100} = \frac{2500}{100}$$

$$x = 25$$

16. During a 24-hour period, the ratio of pop songs played to rap songs played on a radio station is 60:75.

60 75

a) What is the experimental probability that the next song played is rap?

$$\text{TOTAL} = 60 + 75 = 135$$

$$\text{exp } P(\text{rap}) = \frac{75}{135} = \frac{5}{9} \text{ or } 55.\overline{5}\%$$

b) Out of the next 90 songs, how many would you expect to be pop?

$$\left(\frac{\text{pop}}{\text{total}}\right) \quad \frac{60}{135} = \frac{x}{90}$$

$$135x = 60(90)$$

$$\frac{135x}{135} = \frac{5400}{135}$$

$$x = 40$$