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Summer Edition

Seventh Grade Math

Activity 1

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This packet includes four sections that cover the major content of 7th grade math. Each section includes four pages of notes and practice for each topic. For additional support, visit KCS TV on YouTube for instructional videos that accompany each section.

The following content is included in this packet:

	Topic			
	I. Probability	**II. Integers & Rational Numbers**	**III. Ratios & Proportional Relationships**	**IV. Expressions, Equations, & Inequalities**
Activity 1	Experimental Probability of Simple Events	Adding Rational Numbers	Unit Rates	One-Step Equations with Rational Coefficients
Activity 2	Making Predictions with Experimental Probability	Subtracting Rational Numbers	Constant Rates of Change	Solving Two-Step Equations
Activity 3	Theoretical Probability of Simple Events	Multiplying Integers	Percent Increase and Decrease	Writing and Solving One-Step Inequalities
Activity 4	Making Predictions with Theoretical Probability	Applying Integer Operations	Applications of Percent	Solving Two-Step Inequalities

Name _____ Date _____ Class _____

Section I Activity 1

Experimental Probability of Simple Events

Experimental probability is an estimate of the probability that a particular event will happen.

It is called *experimental* because it is based on data collected from experiments or observations.

$$\text{Experimental probability} \approx \frac{\text{number of times a particular event happens}}{\text{total number of trials}}$$

JT is practicing his batting. The pitcher makes 12 pitches. JT hits 8 of the pitches. What is the experimental probability that JT will hit the next pitch?

- A favorable outcome is hitting the pitch.
- The number of favorable outcomes is the number JT hit: 8.
- The number of trials is the total number of pitches: 12.
- The experimental probability that JT will hit the next pitch is $\frac{8}{12} = \frac{2}{3}$.

1. Ramon plays outfield. In the last game, 15 balls were hit in his direction. He caught 12 of them. What is the experimental probability that he will catch the next ball hit in his direction?

   a. What is the number of favorable events? _____

   b. What is the total number of trials? _____

   c. What is the experimental probability that Ramon will catch the next ball hit in his direction?

   _____

2. In one inning Tori pitched 9 strikes and 5 balls. What is the experimental probability that the next pitch she throws will be a strike?

   a. What is the number of favorable events? _____

   b. What is the total number of trials? _____

   c. What is the experimental probability that the next pitch Tori throws will be a strike?

   _____

3. Tori threw 5 pitches for one batter. Kevin, the catcher, caught 4 of those pitches. What is the experimental probability that Kevin will **not** catch the next pitch? Show your work.

   _____

Name _____ Date _____ Class _____

Section I Activity 2

Making Predictions with Experimental Probability

When you have information about previous events, you can use that information to predict what will happen in the future.

If you can throw a basketball into the basket 3 out of 5 times, you can predict you will make 6 baskets in 10 tries. If you try 15 times, you will make 9 baskets. You can use a proportion or multiply to make predictions.

A. Use a proportion.

A survey found that 8 of 10 people chose apples as their favorite fruit. If you ask 100 people, how many can you predict will choose apples as their favorite fruit?

$\frac{8}{10} = \frac{x}{100}$ Write a proportion. *8 out of 10 is how many out of 100?*

$\frac{8}{10} = \frac{x}{100}$ (x 10) Since 10 times 10 is 100, multiply 8 times 10 to find the value of *x.*

$x = 80$

You can predict that 80 of the people will choose apples as their favorite fruit.

B. Multiply.

Eric's baseball coach calculated that Eric hits the ball 49 percent of the time. If Eric receives 300 pitches this season, how many times can Eric predict that he will hit the ball?

$0.49 \times 300 = x$

$147 = x$

Eric can predict that he will hit the ball 147 times.

Solve.

1. On average, 25 percent of the dogs who go to ABC Veterinarian need a rabies booster. If 120 dogs visit ABC Veterinarian, how many of them will likely need a rabies booster?

   Set up a proportion: $\frac{\_\_\_\_}{100} = \frac{x}{\_\_\_\_}$

   Solve for *x:* $x =$ _____

   _____ dogs will likely need a rabies booster.

2. About 90 percent of seventh graders prefer texting to emailing. In a sample of 550 seventh graders, how many do you predict will prefer texting?

   $0.9 \times 550 =$ _____

   _____ seventh graders will likely prefer texting.

Name _____ Date _____ Class _____

Section I Activity 3

Theoretical Probability of Simple Events

The probability, *P*, of an event is a ratio.
It can be written as a fraction, decimal, or percent.

$$P(\text{probability of an event}) = \frac{\text{the number of outcomes of an event}}{\text{the total number of all events}}$$

Example 1

There are 20 red apples and green apples in a bag. The probability of randomly picking a red apple is 0.4. How many red apples are in the bag? How many green apples?

Total number of events ⟶ 2

Probability, *P*: $0.4 = \frac{\text{number of red apples}}{20}$

So:

number of red apples $= 0.4 \times 20 = 8$

number of green apples $= 20 - 8 = 12$

There are 8 red apples and 12 green apples.

Example 2

A bag contains 1 red marble, 2 blue marbles, and 3 green marbles.

The probability of picking a red marble is $\frac{1}{6}$.

To find the probability of **not** picking a red marble, subtract the probability of picking a red marble from 1.

$$P = 1 - \frac{1}{6} = \frac{5}{6}$$

The probability of not picking a red marble from the bag is $\frac{5}{6}$.

Solve.

1. A model builder has 30 pieces of balsa wood in a box. Four pieces are 15 inches long, 10 pieces are 12 inches long, and the rest are 8 inches long. What is the probability the builder will pull an 8-inch piece from the box without looking?

   _____

2. There are 30 bottles of fruit juice in a cooler. Some are orange juice, others are cranberry juice, and the rest are other juices. The probability of randomly grabbing one of the other juices is 0.6. How many bottles of orange juice and cranberry juice are in the cooler?

   _____

3. There are 13 dimes and 7 pennies in a cup.

   a. What is the probability of drawing a penny out without looking?

   _____

   b. What is the probability of **not** drawing a penny? _____

4. If *P*(event A) = 0.25, what is *P*(**not** event A)? _____

5. If *P*(**not** event *B*) = 0.95, what is *P*(event B)? _____

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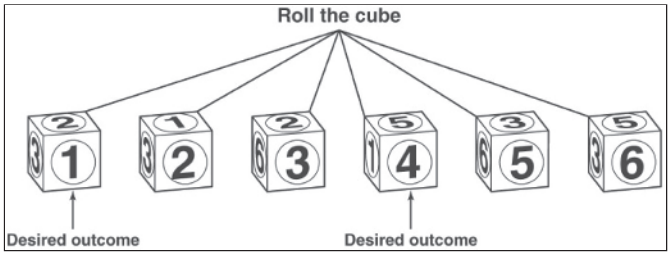
Section I Activity 4

Making Predictions with Theoretical Probability

Predictions are thoughtful guesses about what will happen.
You can create an "outcome tree" to keep track of outcomes.

Sally is going to roll a number cube 21 times.
She wants to know how many times she can expect to roll a 1 or 4.

There are a total of 6 **outcomes**.
Of these, *two* outcomes (1 and 4) are desirable.



Use probability to predict the number of times Sally would roll a 1 or 4.

$$P(1 \text{ or } 4) = \frac{\text{number of desirable outcomes}}{\text{number of possible outcomes}} = \frac{2}{6} = \frac{1}{3}$$

Set up a proportion relating the probability to the number of tries.

$$\frac{1}{3} = \frac{x}{21}$$

$3x = 21$ Cross-multiply.

$x = 7$ Simplify.

In 21 tries, Sally can expect to roll seven 1s or 4s.

For each odd-numbered question, find the theoretical probability. Use that probability to make a prediction in the even-numbered question that follows it.

1. Sandra flips a coin. What is the probability that the coin will land on tails?

_____

2. Sandra flips the coin 20 times. How many times can Sandra expect the coin to land on tails?

_____

3. A spinner is divided into four equal sections labeled 1 to 4. What is the probability that the spinner will land on 2?

_____

4. If the spinner is spun 80 times, how often can you expect it to land on 2?

_____

Answer Key

I. Probability

Activity 1: Experimental Probability of Simple Events

1. a. 12 b. 15 c. 12/15 = 4/5
2. a. 9 b. 14 c. 9/14
3. P(catch) = 4/5 ; P(no catch) = 1 – 4/5 = 1/5

Activity 2: Making Predictions with Experimental Probability

1. 25/100 = x/120; 30; 30
2. 495; 495

Activity 3: Theoretical Probability of Simple Events

1. 8/15
2. 12 bottles of orange juice and cranberry juice
3. a. 7/20 b. 13/20
4. 0.75
5. 0.05

Activity 4: Making Predictions with Theoretical Probability

1. 1/2
2. 10
3. 1/4
4. 20