NAME: _____ DATE: _____

PROBABILITY REVIEW PERIOD: _____

PROBABILITY REVIEW

Here is a checklist of topics you need to know for your Probability test.

_____ Probability of simple events (*unlikely, likely, as likely as not, certain, and impossible*)

_____ Finding the complement of an event

_____ Theoretical Probability vs. Experimental Probability

_____ Counting the number of possible outcomes

1. Making a list of all possible outcomes
2. Tree diagrams
3. Fundamental Counting Principle

_____ Determining whether events are independent or dependent

_____ Probability of Independent/Dependent Events

_____ Making predictions

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PROBABILITY REVIEW

The probability of an event is a ratio written as a fraction that compares the number of favorable outcomes to the number of possible outcomes.

1) A bag contains 3 red marbles, 5 green marbles, 2 blue marbles and 6 yellow marbles. Evan picks one marble from the bag at random. Write each probability as a fraction in simplest form.

a) P (yellow) = _____ b) P (red or yellow) = _____

2) A box contains 6 black crayons, 4 blue crayons, 5 red crayons, 3 yellow crayons, 2 white crayons. One crayon is chosen at random. Write each probability as a fraction in simplest form.

a) P (black) = _____ b) P (blue) = _____

c) P (not white) = _____ d) P (pink) = _____

e) P (black or blue) = _____ f) P (blue, red, or yellow) = _____

3) The numbers from 1 through 25 are written on slips of paper and one is selected at random. Write each probability as a fraction in simplest form.

a) P (odd) = _____ b) P (3-digit number) = _____

c) P (not 4) = _____ d) P (positive) = _____

e) P (prime) = _____ f) P (greater than 19) = _____

An organized list can help you determine the number of possible combinations or outcomes. One type of organized list is a *tree diagram*.

4) An electronics store offers a model 2010 processor with a choice of 2 monitors (15-inch and 17-inch) and 2 printers (inkjet and laser). Draw a tree diagram to determine how many different computer systems are available.

5) A museum tour includes a box lunch which contains a ham, turkey, or cheese sandwich and an apple, a banana, an orange, or a pear. An equal number of all lunch combinations are available for each tour. Draw a tree diagram to determine the number of outcomes.

If event *M* can occur in *m* ways and is followed by event *N* that can occur in *n* ways, then the event *M* followed by the event *N* can occur in $m \cdot n$ ways. This principle is known as the Fundamental Counting Principle.

6) Use the Fundamental Counting Principle to find the number of possible outcomes.

a) A test consists of 5 true-false questions.

b) A number cube is rolled, a dime and penny are tossed.

c) Canned beans are packed in 3 sizes and 7 varieties.

d) There are 5 choices for each of 6 multiple-choice questions on a history quiz.

The probability of two independent events can be found by multiplying the probability of the first event by the probability of the second event.

7) A card is drawn from a deck of 10 cards numbered 1-10 and a number cube is rolled. Find each probability in simplest form.

a) P (10 and 3)

b) P (2 and an even number)

c) P (2 and a prime number)

d) P (9 and an odd number)

e) P (2 and a number less than 4)

f) P (two numbers greater than 5)

If two events, A and B, are dependent, then the probability of both events occurring is the product of the probability of A and the probability of B after A occurs.

8) There are 4 red pencils, 6 green pencils, and 5 yellow pencils in a jar. Once a pencil is selected, it is not replaced. Find each probability in simplest form.

a) P (red and then yellow)

b) P (2 green)

c) P (green and then yellow)

d) P (red and then green)

Probability based on frequencies obtained by conducting an experiment are called *experimental probabilities*. Probability based on known characteristics or facts are called *theoretical probability*. Theoretical probability tells you what should happen in an experiment. By performing more trials, you tend to get experimental results that are closer to the theoretical probabilities.

9) Use the table that shows the results of spinning a game spinner 50 times.

COLOR	NUMBER OF TIMES
green	18
red	24
blue	8

a) Based on the results in the table, what is the probability of spinning green?

b) Based on the results, how many green spins would you expect to occur in 300 spins?

c) What is the theoretical probability of spinning green?

d) Based on the theoretical probability, how many green spins would you expect to occur in 300 spins.

A proportion can be used when making predictions. Find the experimental probability or theoretical probability of that event and set it equal to $\frac{x}{total}$. Then solve for x.

10) If you roll a number cube 600 times, about how many times do you expect to roll a 3 or a 6?

11) A spinner has 6 sections of equal size. Two sections are colored blue, 3 sections are colored red, and 1 section is colored yellow. If you spin the spinner 50 times, how often do you expect to land on blue?

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PROBABILITY PERIOD: _____

PROBABILITY REVIEW

The probability of an event is a ratio written as a fraction that compares the number of favorable outcomes to the number of possible outcomes.

1) A bag contains 3 red marbles, 5 green marbles, 2 blue marbles and 6 yellow marbles. Evan picks one marble from the bag at random. Write each probability as a fraction in simplest form. Total = 16

a) P (yellow) = $\frac{6}{16} = \frac{3}{8}$

b) P (red or yellow) = $\frac{9}{16}$

3 + 6 = 9

2) A box contains 6 black crayons, 4 blue crayons, 5 red crayons, 3 yellow crayons, 2 white crayons. One crayon is chosen at random. Write each probability as a fraction in simplest form. TOTAL = 20

a) P (black) = $\frac{6}{20} = \frac{3}{10}$

b) P (blue) = $\frac{4}{20} = \frac{1}{5}$

c) P (not white) = $\frac{18}{20} = \frac{9}{10}$

d) P (pink) = $\frac{0}{20} = 0$

e) P (black or blue) = $\frac{10}{20} = \frac{1}{2}$

f) P (blue, red or yellow) = $\frac{12}{20} = \frac{3}{5}$

6 + 4 = 10

4 + 5 + 3 = 12

3) The numbers from 1 through 25 are written on slips of paper and one is selected at random. Write each probability as a fraction in simplest form.

a) P (odd) = $\frac{13}{25}$

b) P (3-digit number) = $\frac{0}{25} = 0$

c) P (not 4) = $\frac{24}{25}$

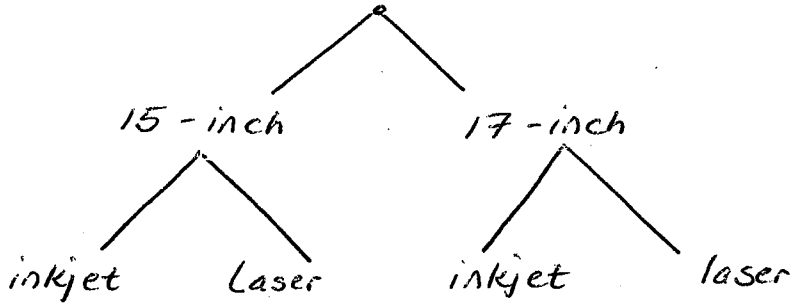
d) P (positive) = $\frac{25}{25} = 1$

e) P (prime) = $\frac{9}{25}$

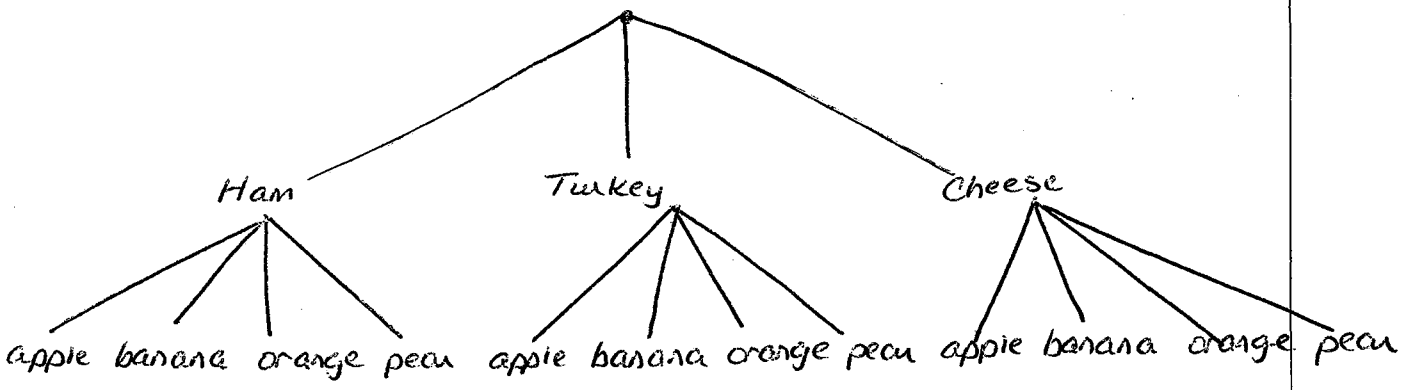
f) P (greater than 19) = $\frac{6}{25}$

An organized list can help you determine the number of possible combinations or outcomes. One type of organized list is a *tree diagram*.

4) An electronics store offers a model 2010 processor with a choice of 2 monitors (15-inch and 17-inch) and 2 printers (inkjet and laser). Draw a tree diagram to determine how many different computer systems are available.



5) A museum tour includes a box lunch which contains a ham, turkey, or cheese sandwich and an apple, a banana, an orange, or a pear. An equal number of all lunch combinations are available for each tour. Draw a tree diagram to determine the number of outcomes.



If event *M* can occur in *m* ways and is followed by event *N* that can occur in *n* ways, then the event *M* followed by the event *N* can occur in $m \cdot n$ ways. This principle is known as the Fundamental Counting Principle.

6) Use the Fundamental Counting Principle to find the number of possible outcomes.

a) A test consists of 5 true-false questions.

$$\underset{1st}{2} \cdot \underset{2nd}{2} \cdot \underset{3rd}{2} \cdot \underset{4th}{2} \cdot \underset{5th}{2} = 32$$

b) A number cube is rolled, a dime and penny are tossed.

$$\underset{\#cube}{6} \cdot \underset{10¢}{2} \cdot \underset{1¢}{2} = 24$$

c) Canned beans are packed in 3 sizes and 7 varieties.

$$\underset{sizes}{3} \cdot \underset{varieties}{7} = 21$$

d) There are 5 choices for each of 6 multiple-choice questions on a history quiz.

$$\underset{1st}{5} \cdot \underset{2nd}{5} \cdot \underset{3rd}{5} \cdot \underset{4th}{5} \cdot \underset{5th}{5} \cdot \underset{6th}{5} = 15,625$$

The probability of two independent events can be found by multiplying the probability of the first event by the probability of the second event.

7) A card is drawn from a deck of 10 cards numbered 1-10 and a number cube is rolled. Find each probability in simplest form.

a) P (10 and 3) = $P(10) \times P(3)$

$\frac{1}{10} \cdot \frac{1}{6}$

$\frac{1}{60}$

b) P (2 and an even number)

$P(2) \times P(\text{even \#})$

$\frac{1}{10} \cdot \frac{3}{6}$

$\frac{1}{20}$

c) P (2 and a prime number)

$P(2) \times P(\text{prime \#})$

$\frac{1}{10} \cdot \frac{3}{6}$

$\frac{1}{20}$

d) P (9 and an odd number)

$P(9) \times P(\text{odd \#})$

$\frac{1}{10} \cdot \frac{3}{6}$

$\frac{1}{20}$

e) P (2 and a number less than 4)

$P(2) \times P(\# < 4)$

$\frac{1}{10} \cdot \frac{3}{6}$

$\frac{1}{20}$

f) P (two numbers greater than 5)

$P(\# > 5) \times P(\# > 5)$

$\frac{5}{10} \cdot \frac{1}{6}$

$\frac{1}{12}$

If two events, A and B, are dependent, then the probability of both events occurring is the product of the probability of A and the probability of B after A occurs.

8) There are 4 red pencils, 6 green pencils, and 5 yellow pencils in a jar. Once a pencil is selected, it is not replaced. Find each probability in simplest form.

a) P (red and then yellow)

$P(\text{red}) \times P(\text{yellow})$

$\frac{4}{15} \cdot \frac{5}{14}$

$\frac{2}{21}$

b) P (2 green)

$P(\text{green}) \times P(\text{green})$

$\frac{6}{15} \cdot \frac{5}{14}$

$\frac{1}{7}$

c) P (green and then yellow)

$P(\text{green}) \times P(\text{yellow})$

$\frac{6}{15} \cdot \frac{5}{14}$

$\frac{1}{7}$

d) P (red and then green)

$P(\text{red}) \times P(\text{green})$

$\frac{4}{15} \cdot \frac{6}{14}$

$\frac{4}{35}$

Probability based on frequencies obtained by conducting an experiment are called *experimental probabilities*. Probability based on known characteristics or facts are called *theoretical probability*. Theoretical probability tells you what should happen in an experiment. By performing more trials, you tend to get experimental results that are closer to the theoretical probabilities.

9) Use the table that shows the results of spinning a game spinner 50 times.

COLOR	NUMBER OF TIMES
green	18
red	24
blue	8

TOTAL = 50

a) Based on the results in the table, what is the probability of spinning green?

$$\frac{18}{50} = \frac{9}{25}$$

b) Based on the results, how many green spins would you expect to occur in 300 spins?

$$\left(\frac{\text{Green}}{\text{Total}}\right) \qquad \frac{18}{50} \overset{\times 6}{\rightarrow} \frac{x}{300}$$

$$50x = 18(300)$$

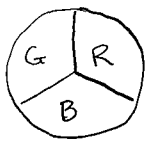
$$\frac{50x}{50} = \frac{5400}{50}$$

$$x = 108$$

108 times

c) What is the theoretical probability of spinning green?

$$\frac{1}{3}$$



d) Based on the theoretical probability, how many green spins would you expect to occur in 300 spins.

$$\left(\frac{\text{Green}}{\text{TOTAL}}\right) \qquad \frac{1}{3} = \frac{x}{300}$$

$$3x = 1(300)$$

$$\frac{3x}{3} = \frac{300}{3}$$

$$x = 100$$

100 times

A proportion can be used when making predictions. Find the experimental probability or theoretical probability of that event and set it equal to $\frac{x}{total}$. Then solve for x.

10) If you roll a number cube 600 times, about how many times do you expect to roll a 3 or a 6?

$\left(\frac{3 \text{ or } 6}{\text{TOTAL}}\right)$

$$\frac{2}{6} = \frac{x}{600}$$

$$6x = 2(600)$$

$$\frac{6x}{6} = \frac{1200}{6}$$

$$x = 200$$

200 times

11) A spinner has 6 sections of equal size. Two sections are colored blue, 3 sections are colored red, and 1 section is colored yellow. If you spin the spinner 50 times, how often do you expect to land on blue?

$\left(\frac{\text{Blue}}{\text{TOTAL}}\right)$

$$\frac{2}{6} = \frac{x}{50}$$

$$6x = 2(50)$$

$$\frac{6x}{6} = \frac{100}{6}$$

$$x = 16.\overline{6}$$

16 or 17 times