PSAT

3

$$4\left(\frac{1}{2}x - \frac{1}{4}y = 10\right)$$ $2x - y = 40$

$$8\left(\frac{1}{8}x - \frac{1}{8}y = 19\right)$$ $-x + y = 152$

Which ordered pair (x, y) satisfies the system of equations above? $x = -112$

A) $(-112, -264)$

B) $(64, 88)$

C) $\left(\frac{232}{3}, \frac{224}{3}\right)$

D) $(288, 536)$

5

In a certain game, a player can solve easy or hard puzzles. A player earns 30 points for solving an easy puzzle and 60 points for solving a hard puzzle. Tina solved a total of 50 puzzles playing this game, earning 1,950 points in all. How many hard puzzles did Tina solve?

A) 10

B) 15

C) 25

D) 35

$30x + 60y = 1950$

$-30(x + y = 50)$

$$\begin{aligned}
30x + 60y &= 1950 \\
+ \quad -30x - 30y &= -1500 \\
\hline
30y &= 450 \\
\frac{30y}{30} &= \frac{450}{30} \\
y &= 15
\end{aligned}$$

27

$$3\left(x = \frac{1}{3}y\right) \quad 3x = y$$
$$154 - 4y = 10x$$

The equations of two lines are shown above. If the lines are graphed in the xy-plane, which of the following ordered pairs represents the point at which the lines would intersect?

A) $(1, 3)$ $154 - 4(3x) = 10x$

B) $(3, 9)$

C) $(5, 15)$

D) $(7, 21)$
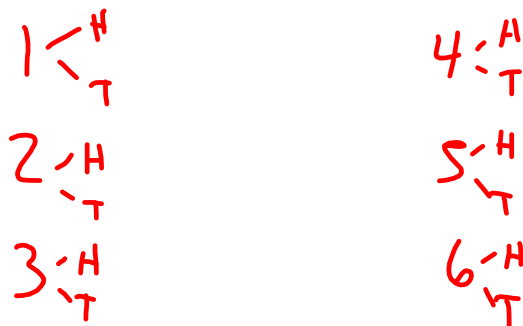
Warm Up:

If you flip a quarter, how many possible outcomes are there? 2
What are they?   H or T

If you roll a six sided die AND flip a coin, how many possible outcomes are there? $6 \cdot 2 = 12$ Draw a tree diagram to show all the possible outcomes. What are they?

1 < H T

2 < H T
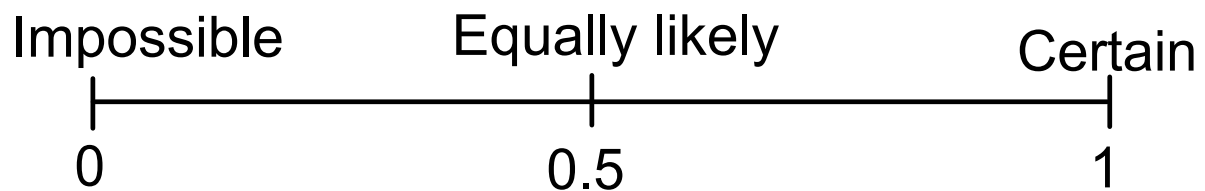
3 < H T

4 < H T

5 < H T

6 < H T

Learning Goal: Today I will learn about theoretical and experimental probability.

Success Criteria: I am able to calculate theoretical and experimental probability and discuss the differences.

Theoretical and Experimental

Probability

Impossible   Equally likely   Certain

0   0.5   1

Probability

Theoretical Probability = $\dfrac{\text{Number of desired outcomes}}{\text{Total number of outcomes}}$

(calculate)

Experimental Probability = $\dfrac{\text{Number of successful events}}{\text{Total number of trials}}$

Example: You toss a coin 10 times and get 6 heads and 4 tails.

What is the theoretical probability of tossing heads?

What is the experimental probability of tossing heads?

Experimental VS Theoretical Probability Lab

Experimental VS Theoretical Probability – **Tossing a Coin**

What is the theoretical probability of getting heads?   Tails?
    Fraction: Decimal:

Toss the coin 25 times. Record the number of heads and tails you toss.

Toss	Heads	Tails
Tally		
Total		

Now calculate the experimental probability of each toss.

Toss	Heads	Tails
Probability (Fraction)		
Probability (Decimal)		

On the back, discuss how the experimental probability of tossing heads or tails compared to the theoretical probability.

Let's look at the theoretical probability as a whole class.
Each group record how many heads and tails you got...

Toss	Heads	Tails
Group Totals		
Class Total		

Now let's calculate the probabilities for the whole class

Toss	Heads	Tails
Probability (Fraction)		
Probability (Decimal)		

How does the experimental probability compare to the theoretical probability?
How does it compare as the number of coin tosses increases?

Let's look at the theoretical probability as a whole class.
Each group record how many cards you got...

Card	Heart	Spade	Club	Diamond
Group Totals	6 5 5 7 4 4	6 8 0 5 7 6	6 6 5 7 9 9	7 6 9 6 5 6
Class Total	31	38	42	39

Now let's calculate the probabilities for the whole class

Card	Heart	Spade	Club	Diamond
Probability (Fraction)	$\frac{31}{150}$	$\frac{38}{150}$	$\frac{42}{150}$	$\frac{39}{150}$
Probability (Decimal)	.21	.25	.28	.26

How does the experimental probability compare to the theoretical probability?
How does it compare as the number of cards drawn increases?

How does the experimental probability compare to the theoretical probability?

How does it compare as the number of cards drawn increases?

Probability - Vocabulary

Outcome -

Sample space -

Probability of an event -

Complement - probability of an event <u>NOT</u> occurring
$$P(NOT\ event) = 1 - P(event)$$

Probability

What is the theoretical probability of:

P(red): $\dfrac{2}{7}$ = .29

P(not red):
$1 - .29 = .7$ $\left(or \dfrac{5}{7} = .71 \right)$

P(yellow): $\dfrac{1}{7}$ = .14

Conduct an experiment with 7 trials. Do your results match the theoretical probability?

Probability

Our solar system's 8 planets, in order of least to greatest distance from the sun are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. You willrandomly draw one of the names of the planets and write a report on that planet.
What is the theoretical probability that you will select a planet farther from the sun than Earth?

$$\dfrac{5}{8} = .63$$

Probability

If you have a bag with 4 red suckers, 5 blue suckers and 3 green suckers and draw one, what are the possible outcomes?

red, blue, green

What is the theoretical probability of drawing a green sucker P(green)?

$$\frac{3}{12} = .25$$

What is the theoretical probability of getting a sucker other than red P(not red)?

$$\frac{8}{12} = .67$$

Probability

A survey was conducted at BCHS. Of the 80 students asked, 35 said that they are taking or intend to take AP Calculus.

What is the probability that a student will take AP Calculus?

$$35/80 = .44$$

If there are 1983 students in total, how many students will take AP Calculus?

$$\frac{35}{80} \nearrow \frac{x}{1983}$$

868 student

$$\frac{69405}{80} = \frac{80x}{80}$$

Probability

Jenny and Mark are able to buy tickets online to a concert 7 out of every 12 times they try. What is the probability that they will score tickets to their favorite band when they are in town?

$$\frac{7}{12} = .58$$

How many concert will they attend this year if they try to get tickets for 8 concerts?

$$\frac{7}{12} = \frac{x}{8}$$
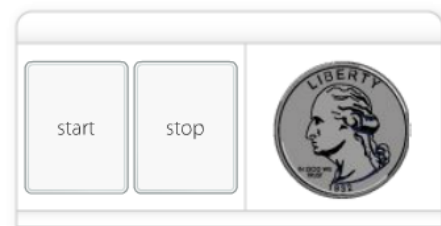
5 concerts

$$\frac{56}{12} = \frac{12x}{12}$$

Closure: Today I learned about experimental and theoretical probability.

Homework

Theoretical and Experimental Probability Worksheet

Probability

What is the theoretical probability of
getting heads P(H)?

What is the experimental probability of
getting heads P(H)?

Probability

What is the experimental probability of
rolling an odd number P(odd)? Does
this match the theoretical probability?