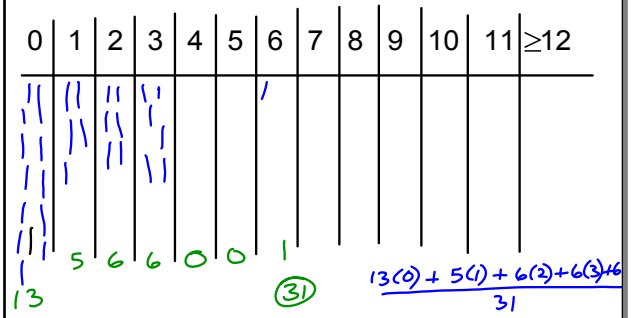


Learning Targets

- I can construct a probability model and/or find missing values.
- I can calculate the expected value of a certain event.

Sep 30-9:59 PM

How many pets do you have?



Sep 30-10:02 PM

Create a probability model of the number of pets in our class?

outcomes	0	1	2	3	6
probability	$\frac{13}{31}$	$\frac{5}{31}$	$\frac{6}{31}$	$\frac{6}{31}$	$\frac{1}{31}$

What's the probability of having 2 pets?

$$\frac{6}{31}$$

If there are 3000 students at CPHS, how many would you expect to have 2 pets?

$$\frac{6}{31} \cdot 3000 = 580.6$$

581
580

What's the expected value of pets (average number of pets per person) in this class?

$$1.3 \text{ pets per person}$$

Sep 30-10:23 PM

In a random sample of 60 students at CPHS (total population 2945), 13 of them said they had an iPad. How many iPad owners would you expect to find in the entire population of CPHS?

$$\frac{13}{60} \cdot 2945 = 638.1$$

$$\frac{13}{60} = \frac{x}{2945}$$

Sep 30-10:38 PM

Expected Value - $E(x)$

An average of all possibilities each weighted by its probability (weighted average - because some things have more weight than others).

$$E(x) = x_1p_1 + x_2p_2 + \dots + x_np_n$$

outcome	x_1	x_2	x_3	...	x_n
probability	p_1	p_2	p_3	...	p_n

Expected Value is a Measure of Center

Sep 30-10:27 PM

A game is played where a dice is rolled once. If the die lands on an even number, the player wins nothing. If the die lands on an odd number, the player wins 3 times the amount on the die. What is the expected value (average amount won per game) of this game?

(winning) outcome	*3	*0	*9	*0	*15	*0
probability	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

$$E(x) = 3\left(\frac{1}{6}\right) + 0\left(\frac{1}{6}\right) + 9\left(\frac{1}{6}\right) + 0\left(\frac{1}{6}\right) + 15\left(\frac{1}{6}\right) + 0\left(\frac{1}{6}\right)$$

$$= \$4.50$$

Sep 30-10:35 PM

A carnival game is played that has several prizes a player can win. Below is a probability model for this game:

Value	\$30	\$20	\$10	\$1
Prob	.01	.03	???.06	.9
	1%	3%	6%	90%

Find the expected value for this game.
What does that mean?

$$E(x) = 30(.01) + 20(.03) + 10(.06) + 1(.9)$$

$$= \$2.40$$

If you pay \$2 to play this game, is it a fair game?

no

Sep 27-8:25 AM

A game is fair if the expected value is equal to the cost of playing the game.

Example: Suppose a casino game has an expected payout of \$1 every time it is played. A player is paid nothing 45% of the time, they are paid \$1, 35% of the time and they are paid \$3, 15% of the time. There is one more payout amount in this game.

Build a probability model. Find the missing payout amount.

Outcomes	\$0	\$1	\$3	X = \$4
Probability	45%	35%	15%	5%
	.45	.35	.15	.05

$$\$1 = \$0(.45) + 1(.35) + 3(.15) + x(.05)$$

$$1 = .35 + .45 + .05x$$

$$1 = .80 + .05x$$

$$-.8 = -.8$$

$$.2 = .05x$$

$$.05 = .05$$

$$x = \$4$$

Sep 27-8:28 AM

Assignment:

Section 3.1 #1, 2, 5, 6, 8-10, 12, 13

Learning Targets

- I can construct a probability model and/or find missing values.
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Sep 27-8:30 AM