

Probability Distribution - Guided Lesson Explanation

Explanation#1

Let X be the random variable. "The number of chipped marbles". Then the value of X are 0, 1, and 2.

The total number of ways to selected 2 objects from a collection of 10 without regard to the order of selection is $C_{12,2}$

The probability of 0 chipped marbles: the number of ways to select 2 good marbles is $C_{9,2}$ and

$$P(0) = \frac{C_{9,2}}{C_{12,2}} = \frac{18}{66} = \frac{6}{22}$$

The probability of 1 chipped marble (1 good ball, 1 chipped ball): the number of ways to select 1 good balls and 1 chipped ball is $C_{9,1} C_{3,1}$ and

$$P(1) = \frac{C_{9,1} * C_{3,1}}{C_{12,2}} = \frac{9 * 3}{66} = \frac{9}{22}$$

The probability of 2 chipped marbles: the number of ways to select 2 chipped marbles is $C_{3,2}$

$$P(2) = \frac{C_{3,2}}{C_{12,2}} = \frac{3}{66} = \frac{1}{22}$$

The probability distribution of X is:

X	0	1	2
$P(X-x)$	$\frac{6}{22}$	$\frac{9}{22}$	$\frac{1}{22}$

Explanation#2

Based on the preceding examples, the probability distribution of X is

X	2	3	4
$P(X-x)$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$



Name _____

Date _____

Explanation#3

Let X be the random variable. "The number of students that takes math class". Then the value of X are 0,1, and 2.

The total number of ways to selected 3 students from a collection of 15 without regard to the order of selection is $C_{15,3}$

The probability of 0 taking a math class: the number of ways to select 2 students that are taking math is $C_{12,2}$ and

$$P(0) = \frac{C_{12,2}}{C_{15,3}} = \frac{24}{91}$$

The probability of 1 is math student (1 math student, 1 non-math student): the number of ways to select 1 that is a math student and 1 that is a non-math student is $C_{12,1} C_{3,1}$ and

$$P(1) = \frac{C_{12,1} * C_{3,1}}{C_{15,3}} = \frac{12 * 3}{455} = \frac{45}{91}$$

The probability of 3 students that take math: the number of ways to select 3 math students is $C_{3,3}$ and

$$P(2) = \frac{C_{3,3}}{C_{15,3}} = \frac{20}{91}$$

The probability distribution of X is:

X	0	1	2	3
P(X=x)	$\frac{24}{91}$	$\frac{45}{91}$	$\frac{20}{91}$	$\frac{2}{91}$

