

CH. 6 - Random Variables

6.1a

random variable: (X) a variable with numerical values that describes the outcomes of a chance process.

probability distribution: gives possible values of the Random Variable with their probabilities.

Discrete Random Variable: Has a fixed amount of possible values

ex: the number of heads when you flip a coin 3 times

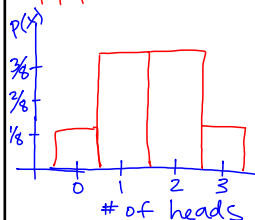
possible outcomes:

HHH
 HHT HTH THH
 THT TTH HTT
 TTT

Probability Distribution:

X	0	1	2	3
$P(X)$	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{8}$

legitimate
 - add to 1
 - $0 \leq P(x) \leq 1$



$$P(X \geq 1) = P(1) + P(2) + P(3)$$

$$= \frac{3}{8} + \frac{3}{8} + \frac{1}{8}$$

$$= \frac{7}{8}$$

$$= 1 - P(0)$$

$$P(X > 1) = \frac{1}{2}$$

ex: the # of girls in a family of 4 kids

possible outcomes: 0, 1, 2, 3, 4

ex: the sum of 2 #'s when you roll 2 dice

example on page 343

Mean of a Discrete Random Variable

(aka Expected value)

μ_x = average of all possible values of X taking into consideration their probabilities.

$$\mu_x = E(X) = \sum X_i P_i = X_1 P_1 + X_2 P_2 + X_3 P_3 \dots$$

Expected value of X

ex: # of heads

$$0 \cdot \frac{1}{8} + 1 \cdot \frac{3}{8} + 2 \cdot \frac{3}{8} + 3 \cdot \frac{1}{8}$$

$$0 + \frac{3}{8} + \frac{6}{8} + \frac{3}{8}$$

$$\frac{12}{8} = \frac{3}{2} = 1\frac{1}{2}$$

on calc: enter X -values in L_1
 enter $P(x)$ in L_2 } order matters

1-var stats L_1, L_2
 ↑
 Freq.

6.1a #1, 5, 7, 9, 13