Equitable Equations: *Random variables*

Problem 1

Identify whether the following random variables are discrete or continuous.

(a) X represents the number of centimeters of rain recorded at a weather station in a month. Continuous - includes decimals

(b) Y represents the number of tweets by a celebrity on a given day. discrete - value on list

Problem 2

The following table shows star ratings (0-5) for a product on Amazon.

total: 576

Stars	0	1	2	3	4	5
Count	22	73	84	101	144	152

X	0	1	2	3	4	5
P(X)	4	13	15	18	25	26

(a) Use this data to construct a discrete probability distribution for a random variable X representing the star rating of a randomly-selected reviewer.

(b) What is the probability that a randomly-selected reviewer gives a rating of at least 3 stars? 50% include 3: 69%

(c) Determine the mean and standard deviation of X.

Mean = $\Sigma XP(x) = 3.27$ $\quad sd = \sqrt{\Sigma(x-3.27)^2 P(x)} = 1.5$

Var = 2.23

Problem 3

Determine the missing probability in the following discrete probability distribution.

x	10	15	20	25	30
P(x)	.22	.31	??	.25	.05

0.17

Compute the mean, variance, and standard deviation of this random variable.

$$\text{Mean} = \Sigma XP(x)$$

$$= (10 \cdot .22) + (15 \cdot .31) + (20 \cdot .17) + (25 \cdot .25) + (30 \cdot .05)$$

$$= 18$$

R = sum (x * p_x)

$$\text{Variance} = \Sigma (x - \text{mean})^2 P(x)$$

$$= .22(10-18)^2 + .31(15-18)^2 + .17(20-18)^2 + .25(25-18)^2 + .05(30-18)^2$$

$$= 37$$

R = sum ((x - mean)^2 * p_x)

$$sd = \sqrt{\text{variance}} = 6.08$$

R = sqrt (sum ((x - mean)^2 * p_x)