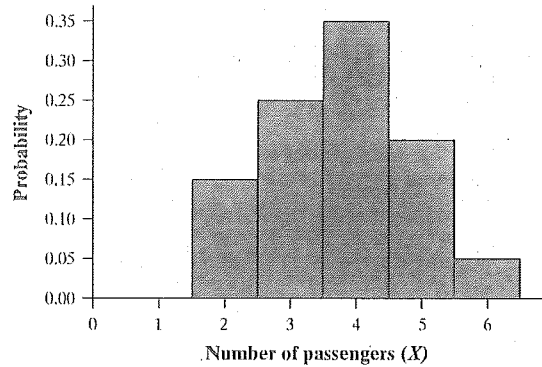


# Homework #1

## Discovering 6.2: Transforming and Combining Random Variables

a.) Pete's Jeep Tours offers a popular half-day trip in a tourist area. There must be at least 2 passengers for the trip to run, and the vehicle will hold up to 6 passengers. Define  $X$  as the number of passengers on a randomly selected day.

Passengers $x_i$	2	3	4	5	6
Probability $p_i$	0.15	0.25	0.35	0.20	0.05

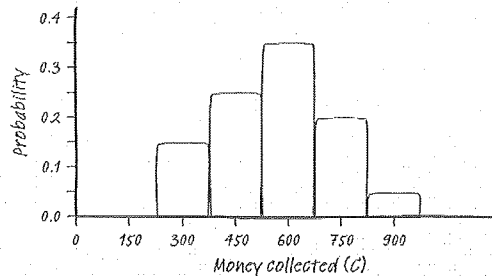


Find the mean of  $X$ . = 3.75

Find the standard deviation of  $X$ . = 1.09

b.) Pete charges \$150 per passenger. The random variable  $C$  describes the amount Pete collects on a randomly selected day.

Collected $c_i$ ( $X$ )150	300	450	600	750	900
Probability $p_i$	0.15	0.25	0.35	0.20	0.05

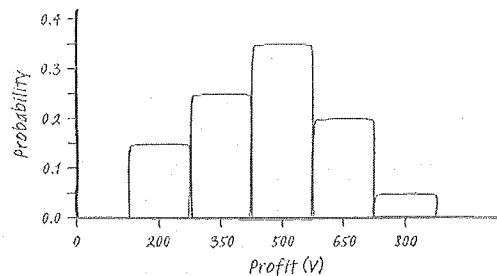


Find the mean of  $X$ . = 562.5

Find the standard deviation of  $X$ . = 163.46

It costs Pete \$100 per trip to buy permits, gas, and a ferry pass. The random variable  $V$  describes the profit Pete makes on a randomly selected day.

Profit $v_i$	200	350	500	650	800
Probability $p_i$	0.15	0.25	0.35	0.20	0.05



Find the mean of  $X$ .  $= 462.5$

Find the standard deviation of  $X$ .  $= 163.46$

Can you make the rules? If  $Y = a + bX$  is a linear transformation of the random variable  $X$ , then

**RULE:** Multiplying (or dividing) each value of a random variable by a number  $b$ :

- Multiplies (divides) measures of center and location by  $b$ . (mean, median, Quartiles, Percentiles)
- Multiplies measures of spread by  $b$ . (Range, IQR, st. dev.)
- Does not change the shape of the distribution.

**RULE:** Adding the same number  $a$  (which could be negative) to each value of a random variable:

- Adds  $a$  to measures of center & location. (Mean,  $\mu$ ,  $Q$ ,  $P_{ac}$ )
- Does not change spread. (R, IQR, st. dev.)
- Does not change shape.