Name: ______________________________ Hour: _____ Date: ______

Lesson 6.2: Day 1: Time for a Raise

Mrs. Gallas' employees have been working very hard and it's time she gives them a raise. She is trying to decide if she should give everyone a \$10 raise (add \$10 per hour) or double everyone's wage (multiply by 2).

Previous lesson's data

1. Copy the data collected from yesterday's lesson below.

X	1	5	7	10	15	25
Probability						

Mean: μ Standard Deviation: σ

2. To make a decision about what raise should be given, complete the tables below and calculate the new mean and standard deviation using your calculator.

a. Option 1: Add \$10 per hour to all employees

Stays the same as previous table

X – Old Wage	1	5	7	10	15	25
Y - New Wage	11	15	17	20	25	35
Probability						

Mean: $\mu + 10$ Standard Deviation: σ

How did adding a constant affect the mean and standard deviation?

The mean is added with \$10.
The standard deviation did not change

b. Option 1: Double the wage of all employees

Stays the same as previous table

X – Old Wage	1	5	7	10	15	25
Z - New Wage	2	10	14	20	30	50
Probability						

Mean: 2μ Standard Deviation: 2σ

How did multiplying by a constant affect the mean and standard deviation?

Both the mean & standard deviation were multiplied by 2.

3. Which option would you prefer? Why?

Answers will vary

Name: ______________________________ Hour: _____ Date: ______

Lesson 6.2 Day 1– Transforming Probability Distributions

Important ideas:

- Adding the same constant, c, to each value …
  - Shape: stays the same
  - center : add c
  - Variability: stays the same

Multiplying the same constant, c, to each value …
- Shape: stays the same
- center: multiply by c
- Variability: multiply by c
  - $SD = \sigma \rightarrow c\sigma$
  - $\text{variance} = (c\sigma)^2 = c^2\sigma^2$

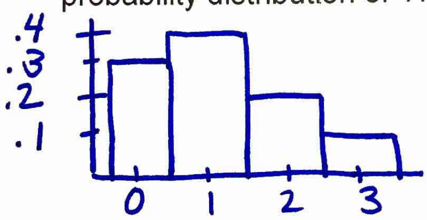
Check Your Understanding

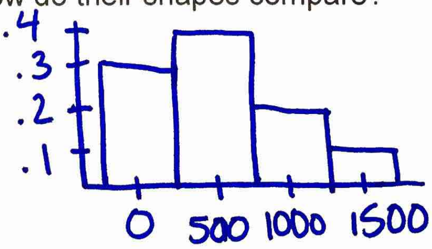
A large auto dealership keeps track of sales made during each hour of the day. Let X = the number of cars sold during the first hour of business on a randomly selected Friday. Based on previous records, the probability distribution of X is as follows:

Cars sold	0	1	2	3
Probability	0.3	0.4	0.2	0.1

The random variable X has mean $\mu_x = 1.1$ and standard deviation $\sigma_x = 0.943$. Suppose the dealership's manager receives a \$500 bonus from the company for each car sold. Let Y = the bonus received from car sales during the first hour on a randomly selected Friday.

1. Sketch a graph of the probability distribution of X and a separate graph of the probability distribution of Y. How do their shapes compare?





2. Find the mean of Y.

$550 = 1.1 × 500

3. Calculate and interpret the standard deviation of Y.

\$ 471.70, The bonuses typically vary by \$471.70 from the mean of \$550.

4. The manager spends \$75 to provide coffee and doughnuts to prospective customers each morning. So the manager's net profit T during the first hour on a randomly selected Friday is \$75 less than the bonus earned. Describe the shape, center, and variability of the probability distribution of T.

Shape will remain the same (skewed right).
mean will be subtracted by 75. $\mu = 550 - 75 = \$475$
SD does not change. $\sigma = 471.70$