

Name: _____ Hour: _____ Date: _____



Is it 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).

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

X	1	5	7	10	15	25
Probability						

Mean: _____

Standard Deviation: _____

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

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

X → Old Wage	1	5	7	10	15	25
Y → New Wage						
Probability						

Mean: _____

Standard Deviation: _____

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

- b. Option 2: Double the original wage of all employees

X → Old Wage	1	5	7	10	15	25
Z → New Wage						
Probability						

Mean: _____

Standard Deviation: _____

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

3. Which option would you prefer? Why?

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Transforming Probability Distributions

Important ideas:

Check Your Understanding

Let X = the number billionaires in a randomly selected state. Based on current records, the probability distribution of X is as follows:

Number of Billionaires	0	1	2	3	4	5	6	8	9	10	11	12	13	17	56	58	118	165
Probability	0.10	0.24	0.06	0.06	0.04	0.08	0.04	0.04	0.06	0.08	0.02	0.02	0.02	0.06	0.02	0.02	0.02	0.02

The random variable X has mean $\mu_x = 12.68$ and standard deviation $\sigma_x = 29.02$. Suppose a law is passed requiring each billionaire to pay \$1,000,000 to their state. Let Y = the money received by a randomly selected state.

1. Consider the graph of the probability distribution of X and a separate graph of the probability distribution of Y . How would their shapes compare?
2. Find the mean of Y .
3. Calculate and interpret the standard deviation of Y .
4. Each state agrees to invest \$500,000 to improve roads. Therefore, the net amount (N) of money a randomly selected state has after the billionaire tax is $N = Y - \$500,000$. Describe the shape, mean, and standard deviation of the probability distribution of N .