Name: _____ Hour: _____ Date: _____

How much will you make next year?

After much thought Mrs. Gallas has finally decided on permanent employee wages which are randomly assigned using the probability distribution *X* given below. Additionally, at the end of every year she gives her employees an hourly raise. The bonuses are assigned randomly according to the probability distribution *Y* given below. Assume *X* and *Y* are independent.

1. Find the mean, variance and standard deviation of the probability distribution of *X*, the hourly wages.

X	9	12	15
Probability	0.30	0.45	0.25

Mean: _____ Variance: _____ Standard Deviation: _____

2. Find the mean, variance and standard deviation of the probability distribution of *Y*, the annual hourly raise.

Y	$1	$3
Probability	0.70	0.30

Mean: _____ Variance: _____ Standard Deviation: _____

3. Let *N* = the new hourly wage for the upcoming year (*X* + *Y*).

a. What are all the possible new hourly wages for the new year?

b. What is the probability of an employee being assigned a $9 wage **AND** a $1 raise? Show your work.

c. Complete the table below for the probability distribution of *N* = *X* + *Y* and find the mean and standard deviation.

N						
Probability						

Mean: _____ Variance: _____ Standard Deviation: _____

d. If *N* = *X* + *Y*, complete the following in terms of *X* and *Y*:

$\mu_N =$ $\sigma_N =$

Name: _____ Hour: _____ Date: _____

Combining Probability Distributions

Important ideas:

Check Your Understanding

Mrs. Chauvet recently had twins. Let X = the number of diaper changes per day for Alyse and Y = the number of diaper changes per day for Jocelyn. Based on a few weeks of careful records, the probability distributions of X and Y are as follows:

Number of diapers changed x_i	3	4	5	6
Probability p_i	0.05	0.25	0.60	0.10

Mean: $\mu_X = 4.75$ SD: $\sigma_X = 0.698$

Number of diapers changed y_i	3	4	5	6
Probability p_i	0.05	0.20	0.55	0.20

Mean: $\mu_Y = 4.9$ SD: $\sigma_Y = 0.768$

Define $T = X + Y$. Assume that X and Y are independent.

a. Find and interpret μ_T.

b. Calculate and interpret σ_T.

c. Alyse wears Diaper size 1, which cost $0.238 per diaper and Jocelyn wears Diaper size 2 which cost $0.2975 per diaper. Find the mean and standard deviation of Mrs. Chauvet's total diaper cost per day.