

Name(s): \_\_\_\_\_

Statistics Worksheet  
Probability  
Created by: Neil E Cotter

Useful Information:

$E$  means "Expected value" or average value.  $\sigma$  means standard deviation, or average variation.

$P(X_i)$  means the probability of an outcome called  $X_i$  (such as  $X_1 = \text{heads}$  or  $X_2 = \text{tails}$  for a coin flip)

$E(X)$  means the average value of experiment  $X$ , such as  $X = \text{throwing a die}$

$\sigma_Y$  means the average variation of experiment  $Y$ , such as  $Y = \text{flipping a coin}$

$$E(X) = \sum_{\substack{\text{possible} \\ \text{outcomes} \\ X_i \text{ for } X}} X_i P(X_i)$$

$$\sigma = \sqrt{\sum_{\substack{\text{possible} \\ \text{outcomes} \\ X_i \text{ for } X}} [X_i - E(X)]^2}$$

- 1) Consider flipping a coin. If it comes up heads, you get \$1. If it comes up tails, you get \$2. What is the average payoff?
  
- 2) Consider throwing a 6-sided die with numbers 1 through 6 on its sides. Find the expected value (or average number) you get.
  
- 3) The expected value for the sum of  $n$  dice is  $n$  times the expected value of throwing one die. What is the expected value of the sum of three 6-sided dice?
  
- 4) The standard deviation for the sum of  $n$  dice is  $\sqrt{n}$  times the standard deviation of throwing one die. The standard deviation for throwing one die is  $\sqrt{35/12} \approx 1.7$ . What is the standard deviation of the sum of four 6-sided dice?