Sample Test 1 – Solution

1)

(a) E(X) = 0.001($1000000) + (0.999)($0) = $1000
Profit = $4000 - $1000 = $3000

(b) It's always a "win" situation for the insurance company because the expected profit is $3000. It will also be a "win" situation for the promoter if the additional revenue generated is larger than the $4,000 of purchasing the insurance.

2)

(a) $E(X) = \sum_{i=1}^{N} X_i P(X_i) = 59$

$E(Y) = \sum_{i=1}^{N} Y_i P(Y_i) = 14$

(b)

$\sigma_X = \sqrt{\sum_{i=1}^{N} \left[X_i - E(X)\right]^2 P(X_i)} = 78.6702$

$\sigma_Y = \sqrt{\sum_{i=1}^{N} \left[Y_i - E(Y)\right]^2 P(Y_i)} = 99.62$

(c) $\sigma_{XY} = \sum_{i=1}^{N} \left[X_i - E(X)\right]\left[Y_i - E(Y)\right] P(X_i Y_i) = -6306$

(d) Stock *X* gives the investor a lower standard deviation while yielding a higher expected return so the investor should select stock *X*.

3)

(a) $P(X > 25) = PZ > 0.8) = 0.2119$

(b) $P(10 < X < 20) = P(-2.2 < Z < -0.2) = 0.4068$

(c) $P(X_{\text{lower}} < X < X_{\text{upper}}) = 0.95$
$P(Z < -1.96) = 0.0250$ and $P(Z < 1.96) = 0.9750$

$Z = -1.96 = \frac{X_{\text{lower}} - 21}{5}$ $\quad$ $Z = +1.96 = \frac{X_{\text{upper}} - 21}{5}$

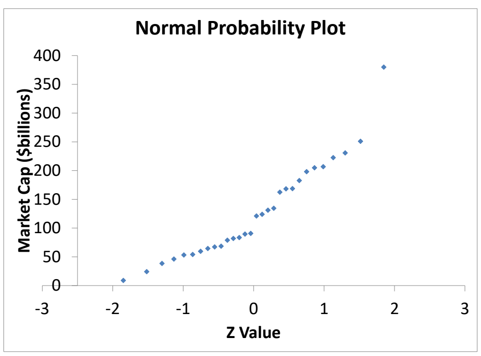
$X_{\text{lower}} = 11.2002$ and $X_{\text{upper}} = 30.7998$

4)

Market Cap ($billions)	
Mean	126.5333
Median	105.85
Mode	#N/A
Standard Deviation	82.75926
Sample Variance	6849.095
Kurtosis	1.382912
Skewness	1.039493
Range	371
Minimum	8.9
Maximum	379.9
Sum	3796
Count	30
First Quartile	64.5
Third Quartile	182.6
Interquartile Range	118.1
CV	65.41%
6*std. dev.	496.5555
1.33*std. dev.	110.0698

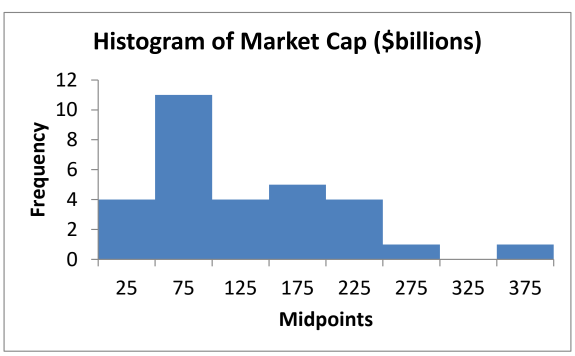
(a) The mean is greater than the median; the range is smaller than 6 times the standard deviation and the interquartile range is greater than 1.33 times the standard deviation. The data do not appear to be normally distributed.

(b)



The normal probability plot suggests that the data are skewed to the right. The kurtosis is 1.3829 indicating a distribution that is more peaked than a normal distribution, with more values in the tails.

(c)



The histogram suggests that the data are skewed to the right.