Math 115 - Quiz 9

November 6, 2014

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (5 points) Consider the table shown below.

x	$P(x)$
3	0.003
4	0.012
5	0.037
6	0.325
7	0.028
8	0.462
9	0.084
10	0.049

(a) Does the table describe a probability distribution? Explain.

Yes!

✓ ALL THE PROBABILITIES ARE BETWEEN 0 & 1

✓ $0.003 + 0.012 + 0.037 + 0.325 + 0.028 + 0.462 + 0.084 + 0.049 = 1$

(b) Find mean value of x (i.e. the expected value).

$$\mu = 3(0.003) + 4(0.012) + 5(0.037) + 6(0.325) + 7(0.028) + 8(0.462) + 9(0.084) + 10(0.049) = \boxed{7.33}$$

(c) Find the standard deviation.

$$\sigma^2 = \left[9(0.003) + 16(0.012) + 25(0.037) + 36(0.325) + 49(0.028) + 64(0.462) + 81(0.084) + 100(0.049)\right] - 7.33^2 \approx 1.759 \Rightarrow \boxed{\sigma \approx 1.33}$$

(d) Use the standard deviation to determine if there are any unusually large values of x.

$$7.33 + 2(1.33) = 9.99$$

ANY VALUE GREATER THAN 9.99 IS UNUSUALLY LARGE $\Rightarrow$ 10 IS LARGE.

(e) Use probabilities to determine if there are any unusually small values of x.

ANY VALUE LESS/EQUAL 4 IS UNUSUALLY SMALL

BECAUSE $P(x \le 4) = 0.015 < 0.05$

HOWEVER, 5 IS NOT UNUSUALLY SMALL BECAUSE $P(x \le 5) = 0.052 > 0.05$