Math 153 - Quiz 11

October 30, 2018

Name key

Score _____

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

1. (5 points) The probability distribution for the random variable x is shown below.

x	0	1	2	3	4	5
$P(x)$	0.04	0.09	0.31	0.48	0.02	0.06

(a) What two features of the table above indicate that it is a probability distribution?

1) $0 \le P(x) \le 1$ FOR EACH X

2) $\sum P(x) = 0.04 + 0.09 + \ldots + 0.06 = 1$

(b) What is the mean value of x?

$\mu = 0(0.04) + 1(0.09) + 2(0.31) + 3(0.48) + 4(0.02) + 5(0.06)$

$= \boxed{2.53}$

(c) What is the standard deviation in x?

$\sigma^2 = 0(0.04) + 1(0.09) + 4(0.31) + 9(0.48) + 16(0.02) + 25(0.06) - 2.53^2$

$= 1.0691$

$\sigma = \sqrt{1.0691} \approx \boxed{1.03}$

(d) Use the mean and standard deviation to determine the unusual values of x.

$\mu - 2\sigma \approx 0.47 \longrightarrow X = 0$ IS UNUSUALLY SMALL

$\mu + 2\sigma \approx 4.59 \longrightarrow X = 5$ IS UNUSUALLY LARGE

(e) Use the 5% rule to determine the unusual values of x.

$\boxed{X = 0}$ IS UNUSUALLY SMALL BECAUSE $P(X \le 0) = 0.04 < 5\%$

NO OTHER X-VALUES ARE UNUSUALLY SMALL

AND NO X-VALUES ARE UNUSUALLY LARGE.