

1342 Class Examples 10/18/18

1. Determine whether the following Random Variables are discrete or continuous.
- The number of A's earned in a section of statistics with 15 students enrolled.

Discrete

- The number of cars that travel through a McDonald's drive-through in the next hour.

Discrete

- The speed of the next car that passes a state trooper.

Continuous.  $T =$  represent the speed of a driver passing a state trooper.  
 $t > 0$

2. Suppose we ask a basketball player to shoot three free throws. Let the random variable  $X$  represent the number of shots made, so  $x = 0, 1, 2,$  or  $3$ . Table 1 shows a probability distribution for the random variable  $X$ . Is this probability distribution valid?

$x$	$P(x)$
0	0.01
1	0.10
2	0.38
3	0.51

is valid

$$\sum P(x) = 1$$

$$0 \leq P(x) \leq 1$$

3. Which of the following is a discrete probability distribution?

x	P(x)
1	0.20
2	0.35
3	0.12
4	0.40
5	-0.07

Not valid  
probability  
of one is  
negative.

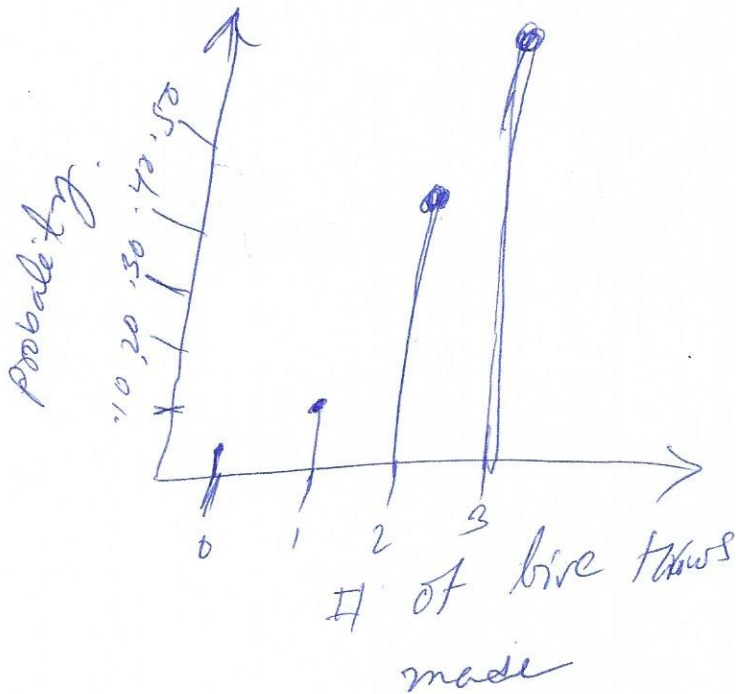
x	P(x)
1	0.20
2	0.25
3	0.10
4	0.14
5	0.49

Not valid  
More than 1

x	P(x)
1	0.20
2	0.25
3	0.10
4	0.14
5	0.31

Valid  
 $0 \leq P(x) \leq 1$

4. Graph the discrete probability distribution given in table 1 from Example 2.



5. Compute the mean of the discrete random variable given in table 1 from Example 2.

$x$	$p(x)$
2	$\frac{2}{10}$
3	$\frac{1}{10}$
4	$\frac{3}{10}$
5	$\frac{2}{10}$
6	$\frac{2}{10}$

$$\mu = 2.14, 66, 44, 23, 53$$

$$\textcircled{5} \mu_{\bar{x}} = 2.39$$

$$\begin{aligned} \sum x \cdot p(x) &= \mu_{\bar{x}} \\ &= \text{mean} \end{aligned}$$

$\mu_{\bar{x}}$  is the mean outcome of the experiment if it is repeated many times.

6. A term life insurance policy will pay a beneficiary a certain sum of money upon the death of a policyholder. These policies have premiums that must be paid annually. Suppose an 18-year-old male buys a \$250,000 1-year term life insurance policy for \$350. According to the *National Vital Statistics Report*, Vol. 58, No. 21, the probability that the male will survive the year is 0.998937. Compute the expected value of this policy to the insurance company.

$$E(\bar{x}) = \sum x \cdot p(x)$$

$x$	$p(x)$
\$350	0.998937
<del>350</del> - 250,000	
-\$249,650	0.001063

$$.350 \times .998937 + (249650 \times 0.001063)$$

$$= \underline{\underline{\$84.25}}$$

7. Find the standard deviation of the discrete random variable given in table 1 from Example 2.