

07/23/2019

## Random variable

outcome of probability experiment recorded as numerical value.

$$.1 + .5 + .005 + .25 + .1 \neq 1.$$

So, it's not a probability distribution.

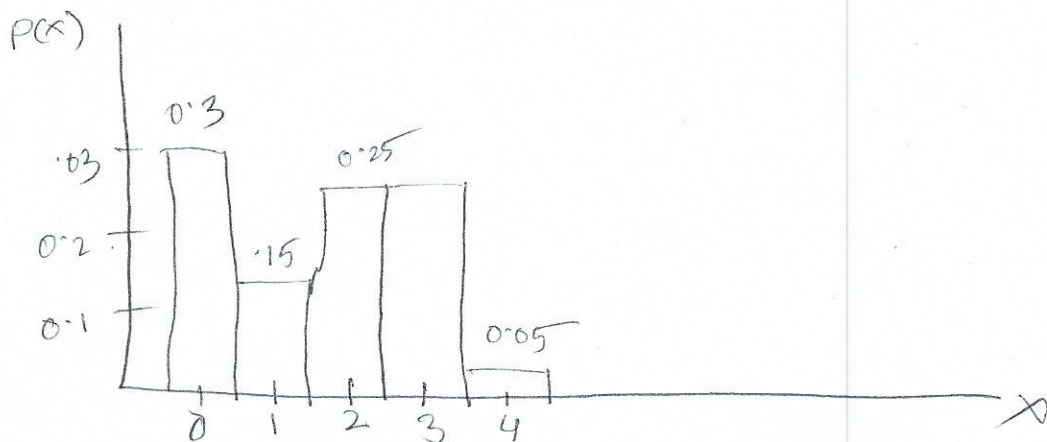
Probability can not be negative.

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

Probability add up to one.

$$P(2) = 1 - (.3 + .15 + .25 + .05) \\ = 1 - .75 = .25$$

Ex 4: Graph the probability distribution.



$$\mu_x = 0 \times 0.3 + 1 \times .15 + 2 \times .25 + 3 \times .25 + 4 \times .05$$

$$= 0 + .15 + .5 + .75 + .20$$

$$= 1.60$$

$x$	$P(x)$
0	
1	
2	
3	
4	
5	

$$E(x) = 0 \times 260 + 1 \times 500 + 2 \times 425 + 3 \times 305 + 4 \times 175 + 5 \times 45$$

$$= \text{€} 1910 \text{ students}$$

$x$	$P(x)$
0	$\frac{260}{1910}$
1	$\frac{500}{1910}$
2	$\frac{425}{1910}$
3	$\frac{305}{1910}$
4	$\frac{175}{1910}$
5	$\frac{45}{1910}$

It's expected on average that a student will have about

$X$	$P(X)$	$L_2 = L_1 - 1.8654$ $(X - \mu)$	$(X - \mu)^2$	$P(X)(X - \mu)$ $L_3 = L_2 * L_4$
0	260/1710	-1.8654	3.4801	0.52913
1	.	-0.8654	0.74909	0.21903
2	.	0.1345	0.01809	0.0045
3	.	1.1345	1.2871	0.22957
4	.	2.1345	4.5561	0.46627
5	.	3.1345	9.8251	0.25856

Variance  $\sigma^2 = 2.1 = 1.70705562$ .

Std dev  $\sigma = \sqrt{1.70705562} = 1.306542211$

On Avg there is a spread of 1 accid from the  $\mu_x = 1.8654$  mean of 2 accid per student per year.

$P(\text{at most 2 accident per year})$   
 $= P(0) + P(1) + P(2)$   
 $= \frac{260}{1710} + \frac{800}{1710} + \frac{425}{1710} \approx 0.69$

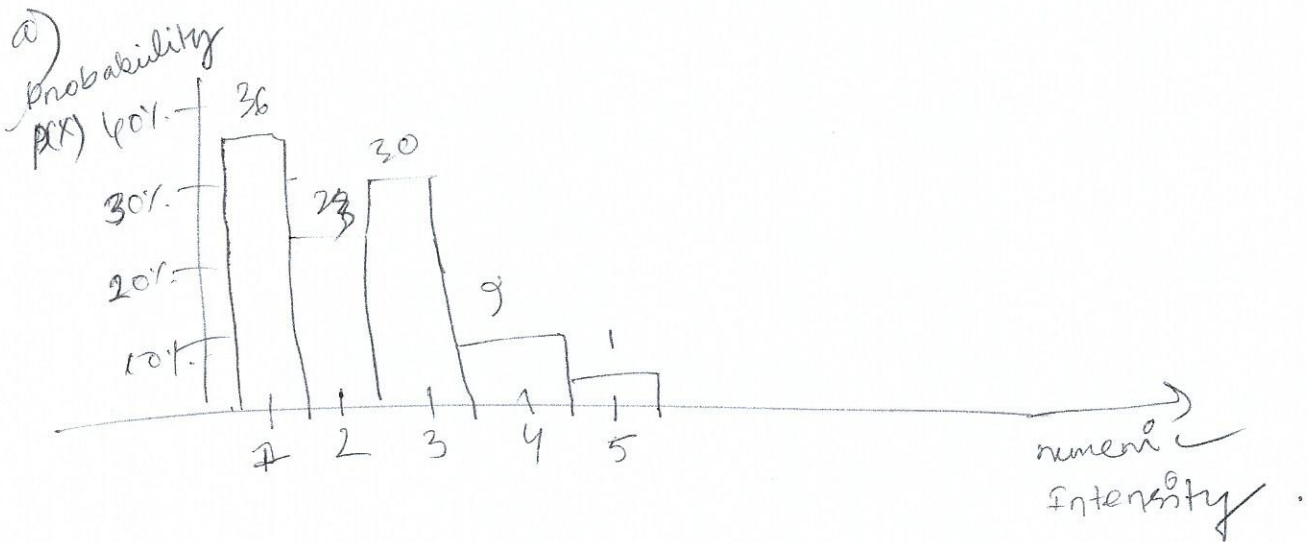
P(at least 4 accidents)

$$= P(4) + P(5) = \frac{175}{1710} + \frac{45}{1710}$$

$$= \frac{220}{1710}$$

$$= 13\%$$

$x$	$P(x)$	$\%$
1	$53/158$	<del>33%</del> 36%
2	$37/158$	30% 24%
3	$47/158$	9% 30%
4	$15/158$	9%
5	$2/158$	1%



$$\mu_x \approx 2.2$$

$$\sigma_x \approx 1.1$$

$$\sigma^2 = \approx 1.12$$

It's expected the intensity of Hurricane between 1900 & 1996 is about 2 with spread of intensity 1 from the mean of 2.

$$c. P(X \geq 4) = P(4) + P(5) = \frac{15}{158} + \frac{2}{158} \approx 0.1076$$

The prob of a hurricane selected at random of intensity of 4 or more is about 10.76%.

$$d. P(X < 3)$$

$$= P(1) + P(2)$$

$$= \frac{57}{158} + \frac{37}{158} = 0.5949$$

The prob of a hurricane selected at random of int of less than 3 is about 59.49%.  
(1900-1996)

