Objective 2: I can construct a discrete probability distribution and its graph.

Each value of a discrete random variable can be assigned a probability. By listing each value of the random variable and its corresponding probability, we form a prob. dist. . Let's create a probability distribution for rolling a 6-sided die.

X: outcomes

P(x): prob. of each outcome

X	1	2	3	4	5	6
P(x)	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

There are two properties that will always be true of a discrete probability distributions.

In Words	In Symbols
1) Each probability is from 0 to 1, inclusive.	$0 \leq P(x) \leq 1$
2) The sum of the prob. is equal to 1.	$\sum P(x) = 1$

Because probabilities represent relative frequency a discrete probability distribution can be graphed with a rel. freq. histogram.

Steps to constructing a discrete probability distribution

Let x be a discrete random variable with possible outcomes $x_1, x_2, x_3, \ldots x_n$

1) Make a freq. dist of all the outcomes (x's).

2) Find $\sum f$

3) Find $P(x) : \frac{f}{\sum f}$

4) Check the 2 properties:

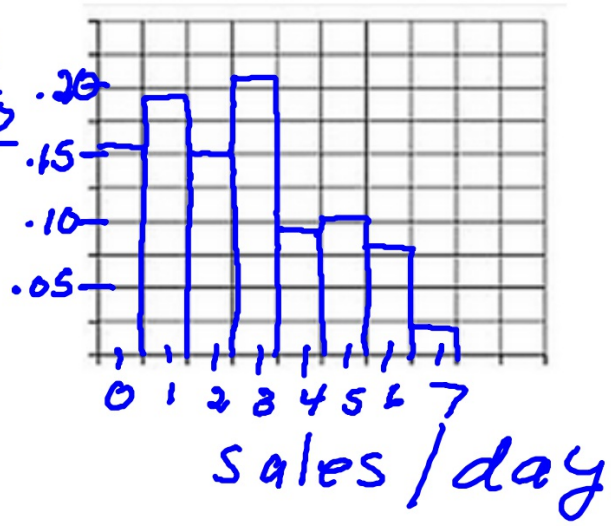
   1) $0 \leq p(x) \leq 1$

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

*Read Example 2, pg 196

TIY 2: A company tracks the number of sales new employees make each day during a 100-day probationary period. The results for one new eomplyee are shown below. Construct and graph a probability distribution.

Sales per day, x	Number of days, f	$P(x) = \frac{f}{100}$
0	16	.16
1	19	.19
2	15	.15
3	21	.21
4	9	.09
5	10	.10
6	8	.08
7	2	.02
$\Sigma = 100$		$\Sigma = 1$



*Read Ex 3 & 4, pg 197 to see how to verify that a distribution **IS** a probability distribution.

TIY 3 and 4: Are the distributions below probability distributions? Explain why or why not.

A) NO

x	0	1	2	3	4
y	0.38	0.12	0.25	0.07	0.15

① $0 \le P(x) \le 1$ ✓

② $\Sigma P(x) = .97$ ✗

B) yes

x	0	1	2	3	4
y	0.22	0.31	0.19	0.12	0.16

① $0 \le P(x) \le 1$ ✓

② $\Sigma P(x) = 1$ ✓

C) yes

x	5	6	7	8
$P(x)$	$\frac{1}{16}$	$\frac{5}{8}$	$\frac{1}{4}$	$\frac{1}{16}$

$\frac{1}{16}\ \frac{10}{16}\ \frac{4}{16}\ \frac{1}{16}$

① ✓

② ✓ $\frac{16}{16} = 1$

D) yes

x	1	2	3	4
$P(x)$	0.09	0.36	0.49	0.06

① ✓

② ✓