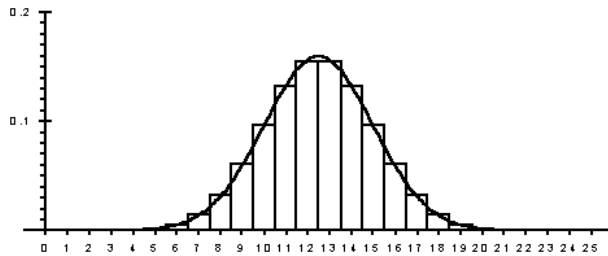


Normal Approximation to Binomial Distribution:

	Normal	Binomial
mean	μ	$n \times p$
standard deviation	σ	$\sqrt{n \times p \times (1 - p)}$

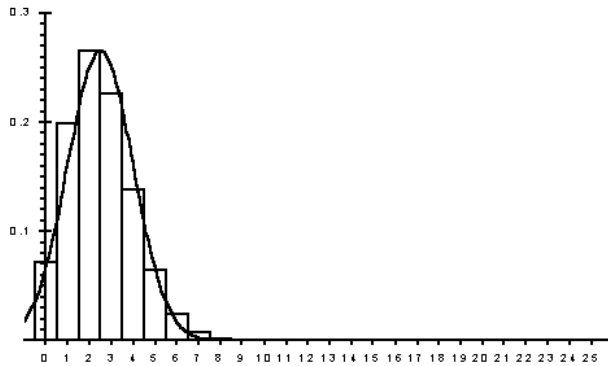


Binomial, $n = 25, p = 0.50.$

Normal, $\mu = 25 \times 0.50 = 12.5,$

$$\sigma^2 = 25 \times 0.50 \times 0.50 = 6.25.$$

$$\sigma = 2.5.$$



Binomial, $n = 25, p = 0.10.$

Normal, $\mu = 25 \times 0.10 = 2.5,$

$$\sigma^2 = 25 \times 0.10 \times 0.90 = 2.25.$$

$$\sigma = 1.5.$$

$$n \times p \geq 5$$

$$n \times p - 3\sqrt{n \times p \times (1 - p)} \geq 0$$

$$n \times (1 - p) \geq 5$$

$$n \times p + 3\sqrt{n \times p \times (1 - p)} \leq n$$

1. A fair coin is tossed 25 times. Let X denote the number of H's.

a) Find the probability $P(X = 17).$

b) Use Normal approximation to find the probability $P(X = 17).$

$$\mu = n \times p$$

$$\sigma = \sqrt{n \times p \times (1 - p)}$$

c)	Find the probability $P(X \geq 11)$.	Binomial, $n = 25, p = 0.50$
		PMF CDF
		0 0.0000 0.0000
		1 0.0000 0.0000
		2 0.0000 0.0000
		3 0.0001 0.0001
		4 0.0004 0.0005
d)	Use Normal approximation to find the probability $P(X \geq 11)$.	5 0.0016 0.0020
		6 0.0053 0.0073
		7 0.0143 0.0216
		8 0.0322 0.0539
		9 0.0609 0.1148
		10 0.0974 0.2122
		11 0.1328 0.3450
		12 0.1550 0.5000
		13 0.1550 0.6550
		14 0.1328 0.7878
		15 0.0974 0.8852
e)	Find the probability $P(10 \leq X \leq 14)$.	16 0.0609 0.9461
		17 0.0322 0.9784
		18 0.0143 0.9927
		19 0.0053 0.9980
		20 0.0016 0.9995
		21 0.0004 0.9999
		22 0.0001 1.0000
f)	Use Normal approximation to find the probability $P(10 \leq X \leq 14)$.	23 0.0000 1.0000
		24 0.0000 1.0000
		25 0.0000 1.0000

2. An airline knows that about 15% of the people who buy tickets for a certain flight cancel their reservations. The airline sells 100 tickets for a flight that contains only 92 seats. Assuming that each person either cancels the reservation or not independently, use Normal approximation to find the probability that there will be enough seats for all the passengers.

3. A fair 6-sided die is rolled 180 times.

a) Find the exact probability that “6” shows up exactly 35 times?

b) Use Normal approximation to find the probability that “6” shows up exactly 35 times?

c) Use Normal approximation to find the probability that “6” shows up at least 35 times?

d) Use Normal approximation to find the probability that “6” shows up between 20 and 40 times (both inclusive)?

Normal Approximation to Poisson Distribution:

	Normal	Poisson
mean	μ	λ
standard deviation	σ	$\sqrt{\lambda}$

4. Traffic accidents at a particular intersection follow Poisson distribution with an average rate of 1.4 per week. Use Normal approximation to find the following:
- Find the exact probability that there would be exactly 68 accidents at this intersection in one year (52 weeks).
 - Use Normal approximation to find the probability that there would be exactly 68 accidents at this intersection in one year.
 - Use Normal approximation to find the probability that there would be at most 70 accidents at this intersection in one year.
 - Use Normal approximation to find the probability that there would be between 65 and 80 (both inclusive) accidents at this intersection in one year.