Normal or Binomial?

Normal Distribution:

$\Longrightarrow$ It will say "Normally Distributed"
$\Longrightarrow$ Mean μ is Given
$\Longrightarrow$ Standard Deviation σ is Given

Binomial :

$\Longrightarrow$ Probability p is Given
$\Longrightarrow$ Total Number of trials n is Given

1st Step: Use the Normal Distribution formula:

$$z = \frac{x - \mu}{\sigma}$$

2nd Step: Find the Probability P from the Z score table

CASE 1: (Binomial formula)
If it says **EXACTLY** or if we are considering only a couple of cases:

$$P = {}_{n}^{\square}C_x * p^x * q^{n-x}$$

Case 2:
(Normal approximation for Binomial)
Only if $n * p \geq 5$ *AND* $n * q \geq 5$

If it says less than, more than, at least, at most, fewer or equal to, more than or equal to:

1st Step: find Mean μ & Standard Deviation σ using the formulas:
$$\mu = n \cdot p$$
$$\sigma = \sqrt{n \cdot p \cdot q}$$

2nd Step: Use the formula to find Z

$$z = \frac{x \pm 0.5 - \mu}{\sigma}$$

Use x+0.5:
*for Less than or equal to ($\leq$)
*for greater than ($>$)
Use x - 0.5:
*for greater than or equal to ($\geq$)
*for Less than ($<$)

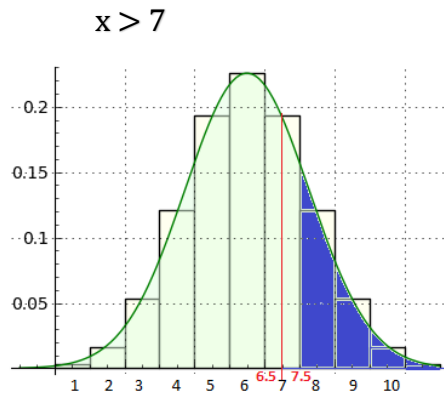**3rd Step**: Find the Probability P from the Z score table

Recall that $q = 1 - p$

Continuity Corrections when using Normal Approximation to Binomial
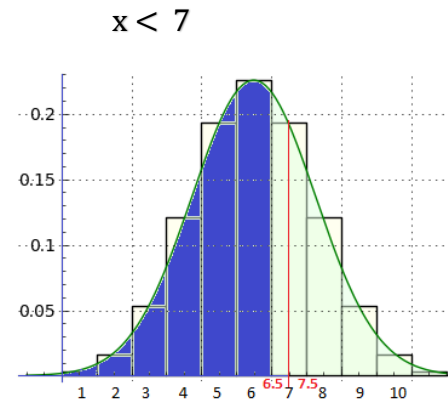
When to add/subtract 0.5 from x:

For > and <

Strictly Greater Than or Less Than questions. "Exclusive"

Example:

x > 7

Need to add (+ 0.5)

Start from 7.5 instead.

x < 7
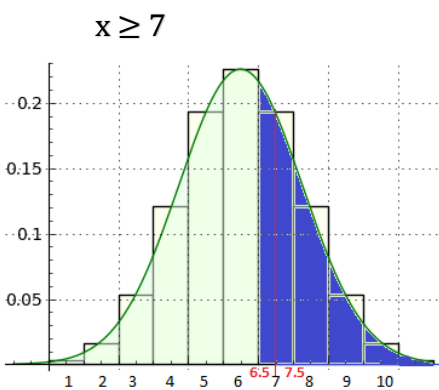

Need to subtract (- 0.5)

Start from 6.5 instead.
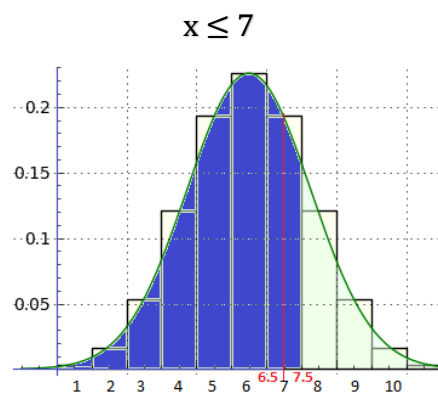
For ≥ and ≤

Greater Than or Equal to, Less Than or Equal to questions, "At Least", "At Most", "Inclusive"

Example:

x ≥ 7

Need to subtract (- 0.5)

Start from 6.5 instead.

x ≤ 7

Need to add (+ 0.5)

Start from 7.5 instead.

We Only use ±0.5 for Approximation Problems!!!!!!!!!!!!!!!!!