SOLUTIONS BZS
ASSIGNMENT #5

① $n = 3000$

$p = 0.18$

THE TRUE probability would be

$$P(438 \le X \le 652) = \sum_{n=438}^{652} \binom{3000}{n} (0.18)^n (0.82)^{3000-n}$$

BUT THIS IS difficult TO compute by hand!

Since $n \cdot p = 3000(0.18) = 540 \geq 5$

& $n \cdot (1-p) = 3000(0.82) = 2460 \geq 5$

We CAN use NORMAL Approximation. WITH CONTINUITY CORRECTION we have:

$P(437.5 \le X \le 652.5)$ $\quad \mu = 3000(0.18) = 540$

$\sigma = \sqrt{3000(0.18)(0.82)} = 21.04$

Z-scores

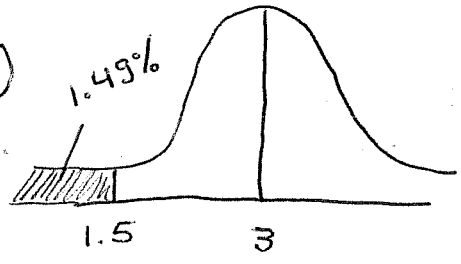
$$Z = \frac{437.5 - 540}{21.04} = -4.87$$

$$Z = \frac{652.5 - 540}{21.04} = 5.35$$

So we WANT $P(-4.87 \le Z \le 5.35) \approx 1$

(Z values are NOT EVEN INCLUDED ON STANDARD NORMAL TABLE since they ARE SO large).

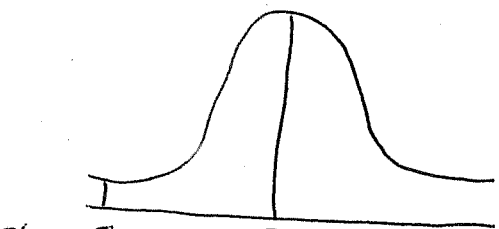
(2)



We can find z-value corresponding to $x = 1.5$

By looking up Area of $(0.5) - (0.0149) = 0.485$ in z-table.

We get $z = -2.17$



we use this to Find σ

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

$$-2.17 = \frac{1.5 - 3}{\sigma} \Rightarrow \sigma = 0.691$$

Now we want

$$P(1.5 \leq x \leq 2.5)$$

Find correspond z-values

For $x = 1.5$ $\quad z = -2.17$

For $x = 2.5$ $\quad z = \frac{2.5 - 3}{0.69} = -0.723$

$$P(1.5 \leq x \leq 2.5) = P(-2.17 \leq z \leq -0.723)$$

$$= 0.485 - 0.264$$

$$= 0.2208 .$$