

Student Name: SOLUTIONS

[Question 1] A student guesses at each of the 100 questions on a multiple choice quiz. Each answer has 5 choices (1 correct, 4 incorrect). Let $X = \#$ of correct answers on the quiz. Estimate the probability of passing the quiz.

$$p = \frac{1}{5} = 0.2$$

$$q = \frac{4}{5} = 0.8$$

$$n = 100$$

$$\mu = 100(0.2) = 20$$

$$\sigma = \sqrt{100 \cdot (0.2) \cdot (0.8)}$$

$$= \sqrt{16}$$

$$= 4$$

Binomial

$$P(x \geq 60) \approx P(x > 59.5) \quad \text{using } N(x; 20, 2)$$

$$= P(z > \frac{59.5 - 20}{4})$$

$$= P(z > \frac{39.5}{4})$$

$$= P(z > 9.875)$$

$$= 0$$

We can use the normal approximation because

$$np > 5$$

$$\& nq > 5$$

MORAL OF THE STORY: DON'T GUESS ON A MULTIPLE CHOICE TEST & EXPECT TO PASS!

[Question 2] Consider $N(X; \mu, 10)$. Use the Z-table to find μ if $P(x < 82.5) = 0.8264$

$$P(x < 82.5) = 0.8264$$

$$P\left(z < \frac{82.5 - \mu}{10}\right) = 0.8264$$

FROM
THE TABLE:

$$P(z < 0.94) = 0.8264$$

$$\text{so } \frac{82.5 - \mu}{10} = 0.94$$

$$82.5 - \mu = 9.4$$

$$\mu = 82.5 - 9.4$$

$$\boxed{\mu = 73.1}$$