Normal Approximation To Binomial

- If $X \sim bin(n, p)$ with $np \geq 10$ and $n(1 - p) \geq 10$, then $X \approx N(\mu = np, \sigma = \sqrt{np(1 - p)})$.

- **Examples:**

  1. Suppose that 40% of all drivers in a certain state regularly wear a seat belt. A random sample of 500 drivers is selected. What is the probability that

     a. fewer than 175 of those in the sample regularly wear a seat belt?

     b. at least 150 of those in the sample regularly wear a seat belt?

     c. between 180 and 230 (inclusive) of the drivers in the sample regularly wear a seat belt?

  2. An unnoticed mechanical failure has caused $\frac{1}{3}$ of a machine shop's production of rifle firing pins to be defective. If an inspector will check 90 random selected pins from this batch, what is the probability that the inspector will find

     a. at least 20 defective pins?

     b. less than 25 defective pins?

     c. no more than 25 defective pins?

     d. between 22 to 34 (inclusive) defective pins?

- **Homework problems:**
  Section 5.5: pp. 274-276; # 68, 69, 70, 73, 76, 78.