

HW 7.3 Part B pages 455 - 456 problems 57, 59, 61, 63, 65-68

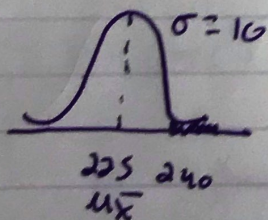
(57) No. The histogram of the sample values will look like the population distribution, whatever it might happen to be. The central limit theorem says that the histogram of the distribution of the sample means (from many large samples) will look more and more normal.

(59) a) Since the distribution of the play times of the population of songs is heavily skewed to the right, a sample size of $n=10$ will not be enough for the Normal approximation to be appropriate) ($10 \neq 30$)
CLT

b) SRS $n=36$

$36 \geq 30$; By CLT, we now have a sample size large enough to have distribution of sample means be \sim Normal.

$$\mu_{\bar{x}} = 225 \quad \sigma_{\bar{x}} = \frac{60}{\sqrt{36}} = 10 \quad N(225, 10)$$



$$P(\bar{x} > 240) = \text{normcdf}(240, \infty, 225, 10) = .0068$$

0.0068

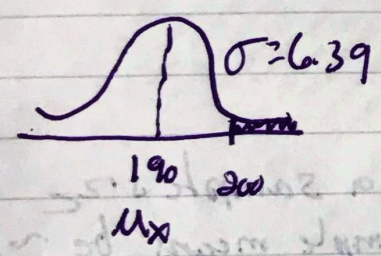
a) This probability cannot be calculated, because we do not know the shape of the distribution of the weights.

b) $n=30$ (30 passengers on plane)
 $W =$ total weight, \downarrow and $\bar{X} = W/30$
the CLT says that \bar{X} is \sim Normal ($30 \geq 30$)
with $\mu_{\bar{X}} = 190$ lb and $\sigma_{\bar{X}} = \frac{35}{\sqrt{30}} \approx 6.39$ lb \checkmark

10(30) \geq pop w/ passengers
300 \geq pop \checkmark

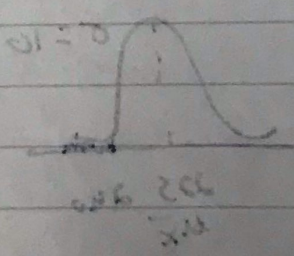
$$P(W > 6000) = P(\bar{X} > \frac{6000}{30}) = P(\bar{X} > 200)$$

$$P(\bar{X} > 200) \sim N(190, 6.39)$$



$$\text{normcdf}(200, \infty, 190, 6.39) = .0588$$

There is about a 6% chance that the total weight limit exceeds the limit of 6000 lb.



HW 7.3 Part B

(63) What is the probability that average loss will be no greater than \$275?

$$P(\bar{x} \leq 275)$$

Plan: SRS $n = 10,000$ where $\mu = \$250$
 so $\mu_{\bar{x}} = \mu = \$250$

✓ 100%

10,000 ≤ population of policies

10,000! pop

reasonable to assume

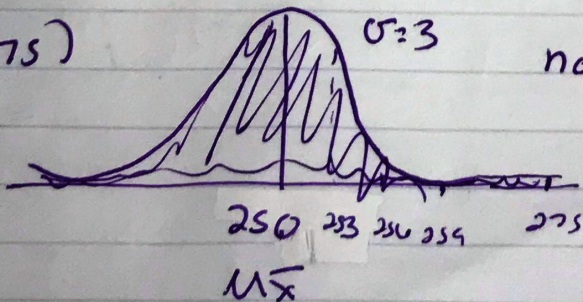
$$\sigma_{\bar{x}} = \frac{300}{\sqrt{10,000}} = \$3$$

✓ Normal

since $n \geq 30$ ($10,000 \geq 30$) CLT says sampling distribution for \bar{x} is \sim Normal

$$\sim N(250, 3)$$

$$P(\bar{x} \leq 275)$$



$$\text{normcdf}(-\infty, 275, 250, 3) = 1$$

100% of the time a company will average a loss less than \$275, so it will never have a loss of \$275 or greater. (so 0% of the time will average loss be \$275 or greater.)

(65) A

$$\mu_x = \mu = 515$$

(66) C

$$\frac{114}{\sqrt{100}} = 11.4$$

(67) B

(68) D