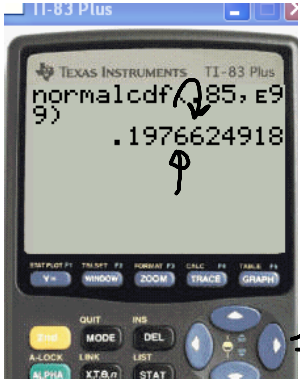
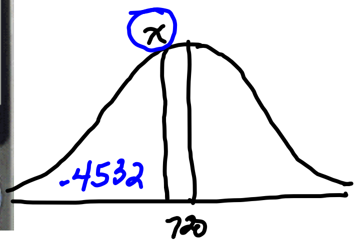
b) $P(Z > 0.85) = \text{normalcdf}(0.85, E99) \approx .1977$



X the variable

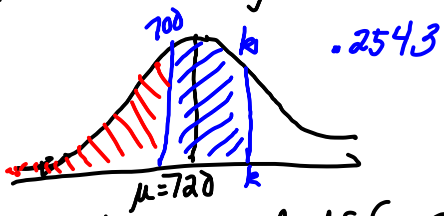


2. c) .2758

3. a) $x = \text{invNorm}(.4532, 720, 82)$

≈ 710.36

b) $P(700 < x < k) = .$



$P(x < 700) = \text{normalcdf}(-E99, 700, 720, 82)$

$\approx .4037$

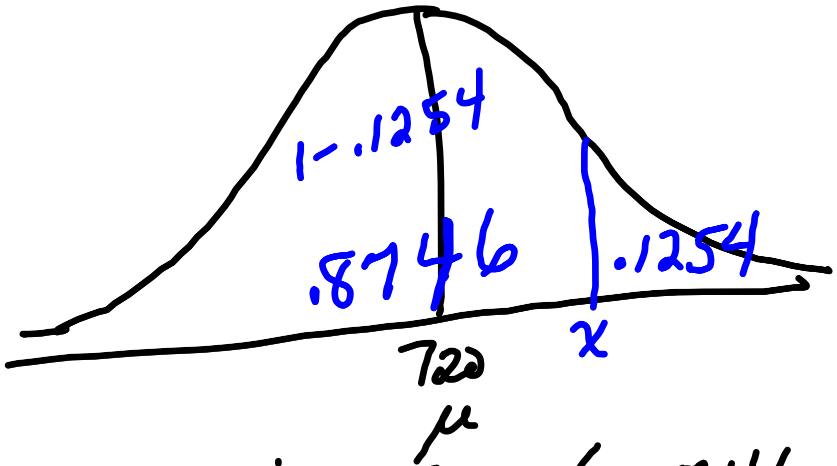
$.2543 + .4037 = .6580$

$$\begin{array}{r} .2543 \\ .4037 \\ \hline .6580 \end{array}$$

$k = \text{invNorm}(.6580, 720, 82)$

≈ 753.37

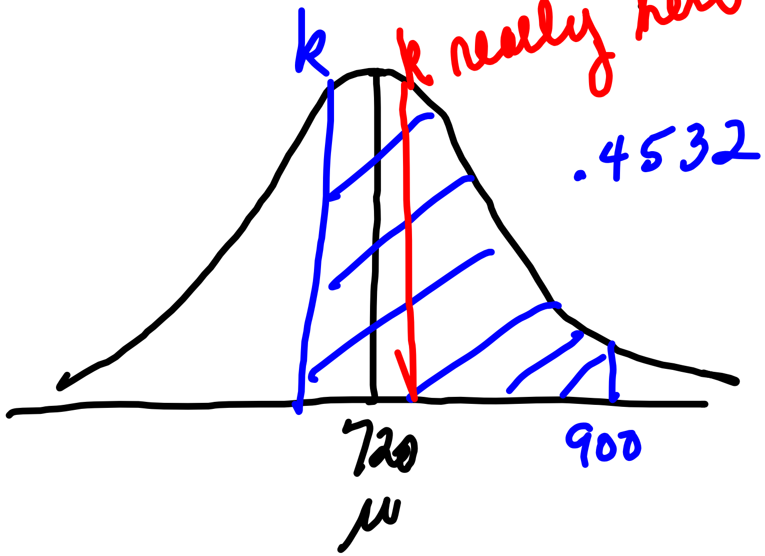
3 c) $P(X > x) = .1254$



$x = \text{invNorm}(.8746, 720, 82)$

≈ 814.17

3 d. $P(k < x < 900)$



subtract

$$\begin{array}{r} .9859 \\ -\,.4532 \\ \hline .5327 \end{array}$$

$P(x < 900) = \text{normalcdf}(-E99, 900, 720, 82)$

$\approx .9859$

$k = \text{invNorm}(.5327, 720, 82)$

≈ 726.73

4. warrenty 40,000 miles

$\mu = 72000$

$\sigma = 12000$

a) $P(x < 40000) = \text{normalcdf}(-E99, 40000, 72000, 12000)$

$\approx .0038$

$\therefore$ .38 % of the transmissions fail before 40000 miles.

b) $P(x > 100000) = \text{normalcdf}(100000, E99, 72000, 12000)$

$\approx .0098$

$\therefore$ .98 % of transmission last more than 100,000 miles.

5

$\mu = 9.125$ in
$\sigma = .06$ in

$P(x < 9 \text{ or } x > 9.25)$

$1 - P(9 < x < 9.25)$

$1 - \text{normalcdf}(9, 9.25, 9.125, .06)$

$1 - .9628$

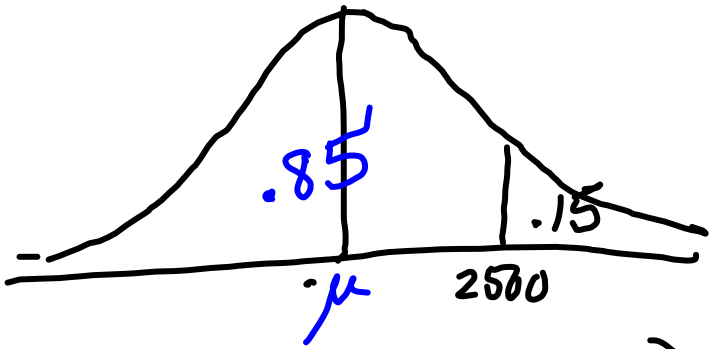
$.0372$

3.72% of baseballs fail the circumference requirement.

6. 15% more than \$2500

$\sigma = \$350$ μ

What is the mean?



$$z = \text{invNorm}(.85)$$
$$= 1.0364$$

$$\mu = 2500 - 1.0364(350)$$

$$\approx 2137.26$$

The average mortgage payment is \$2137.26

$\boxed{7.1}$ Populations & Sampling Distributions

ex $\quad x \quad P(x) \quad xP(x) \quad x^2P(x)$

$$\sum xP(x) = 80.60$$

$$\sum x^2P(x) = 6561.8$$

$$\sigma = \sqrt{\sum x^2 P(x) - \mu^2}$$

$$\approx 8.0895$$

Notice $\bar{x}$ is itself a random variable

Sampling Error $= \bar{x} - \mu$

ADE $\quad \bar{x} = 81.67 - 80.6$

$= 1.07$

$82.33 - 80.6 = 1.73$

$1.73 - 1.07 = \underline{\underline{.66}}$ non-sampling error

i.e error caused by a mistake

$\therefore \mu_{\bar{x}} = \mu$

estimator

<u>unbiased estimator</u> – means $\mu_{\bar{x}} = \mu$

will use most

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

where n is the sample size

$\frac{n}{N} \leq .05$ then we are OK.

$$\frac{25}{10000} = .0025 \leq .05$$

If not true

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} \sqrt{\frac{N-n}{N-1}}$$

finite population correction factor

If $\sigma_{\bar{x}}$ decreases as n increases
that statistic is a
consistent estimator

ex assume $\frac{n}{N} \le .05$ $\mu = 90$
$\sigma = 18$

Find the mean & standard deviation of the sample mean when:

a) $n = 10$

$\mu_{\bar{x}} = 90$ $\sigma_{\bar{x}} = \frac{18}{\sqrt{10}} \approx 5.692$

b) $n = 35$

$\mu_{\bar{x}} = 90$ $\sigma_{\bar{x}} = \frac{18}{\sqrt{35}} \approx 3.043$