MATH 1553/1610
Review 7.5 & 7.6 WS

Name: KEY

1. The average weekly salary for computer programmers in a city is $1750 with a population standard deviation of $400.

a. What percent of the programmers make more than $1850 a week? Answer with a sentence.

$\mu = 1750$

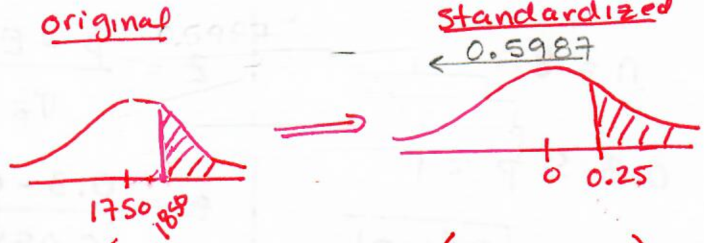
$\sigma = 400$

$x = 1850$

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

$z = \frac{1850-1750}{400}$

$z = 0.25$



$P(x \geq 1850) = P(z \geq 0.25)$

$= 1 - P(z \leq 0.25)$

$= 1 - 0.5987$

$= 0.4013$

For the population, 40.13% of the programmers make more than $1850/wk.

b. From a sample of 60 programmers, what is the probability that the average will be over $1850 a week? Answer with a sentence.

$n = 60$

$x = 1850$

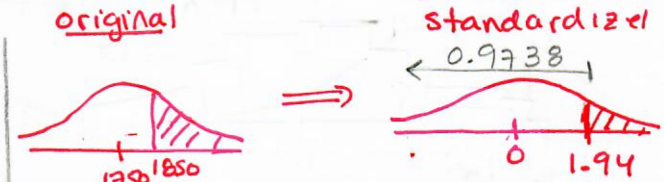
$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$

$= \frac{400}{\sqrt{60}}$

$z = \frac{x-\mu}{\sigma_{\bar{x}}}$

$z = \frac{1850-1750}{\frac{400}{\sqrt{60}}}$

$z = 1.94$



$P(\bar{x} \geq 1850) = P(z \geq 1.94)$

$= 1 - P(z \leq 1.94)$

$= 1 - 0.9738$

$= 0.0262$

For the sample, we expect 2.62% of the programers to make more than $1850/week.

$p = 0.40$ $\qquad\qquad Z = \dfrac{X - \mu}{\sigma}$

2. At a university 40% of the students live in the dorms. If a random sample of 80 students is used in a study, what is the probability that the sample proportion of students living is the dorms is between 0.3 and 0.45?

$\bar{p}$

$p = E(\bar{p}) = 0.40$

$n = 80$

$0.3 \le \bar{p} \le 0.45$

$\sigma_{\bar{p}} = \sqrt{\dfrac{p(1-p)}{n}}$

$= \sqrt{\dfrac{0.4(1-0.4)}{80}}$

$= \sqrt{\dfrac{(0.4)(0.6)}{80}}$

$= 0.0548$

$\bar{p} = 0.3$

$z = \dfrac{\bar{p} - E(\bar{p})}{\sigma_{\bar{p}}}$

$z = \dfrac{0.3 - 0.4}{0.0548}$

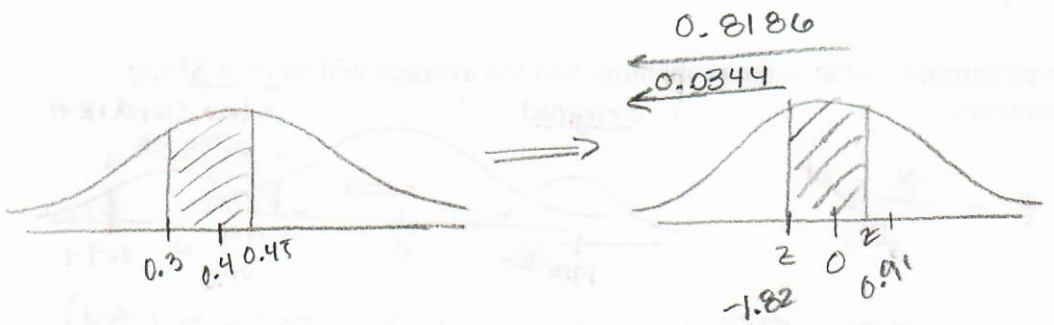
$z = -1.82$

$\bar{p} = 0.45$

$z = \dfrac{\bar{p} - E(\bar{p})}{\sigma_{\bar{p}}}$

$z = \dfrac{0.45 - 0.40}{0.0548}$

$z = 0.91$



$P(0.3 \le \bar{p} \le 0.45) = P(-1.82 \le z \le 0.91)$

$= P(z \le 0.91) - P(z \le -1.82)$

$= 0.8186 - 0.0344$

$= 0.7842$