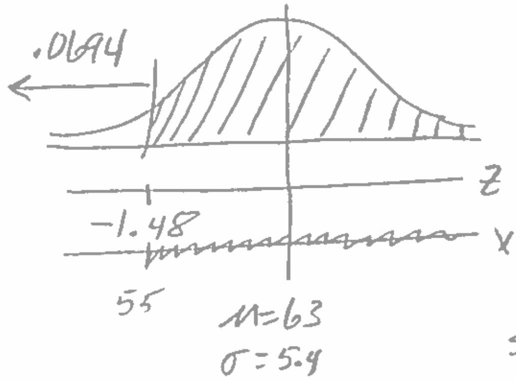
I

SOLUTIONS NORMAL CURVE PRACTICE

④ $\mu = 63$
$\sigma = 5.4$
$P(X > 55)$

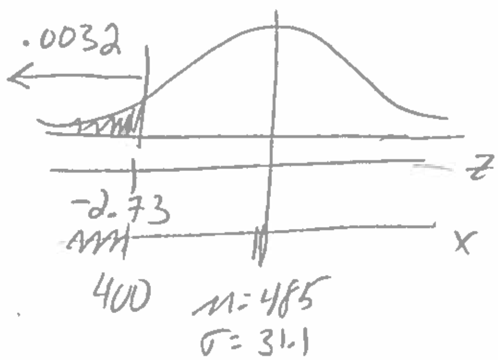


$$z = \frac{x-\mu}{\sigma} = \frac{55-63}{5.4} = -1.48 \longrightarrow .0694$$

TABLE VALUE

so: $P(X>55) = 1 - .0694$
$= \boxed{.9306}$

⑤ $\mu = 485$
$\sigma = 31.1$
$P(X < 400)$

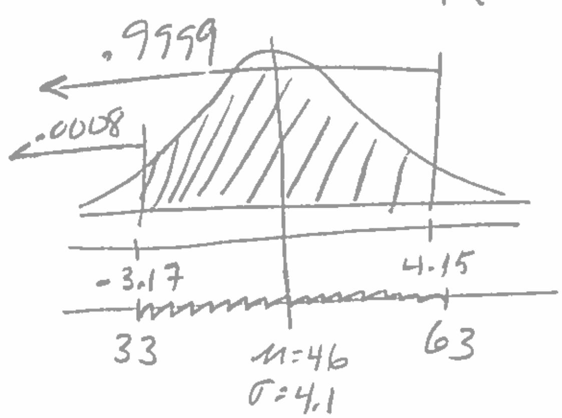


$$z = \frac{x-\mu}{\sigma} = \frac{400-485}{31.1} = -2.73 \Longrightarrow .0032$$

TABLE VALUE

so
$P(X<400) = \boxed{.0032}$

⑥ $\mu = 46$
$\sigma = 4.1$
$P(33 < X < 63)$



$$z_1 = \frac{x-\mu}{\sigma} = \frac{33-46}{4.1} = -3.17 \longrightarrow .0008$$

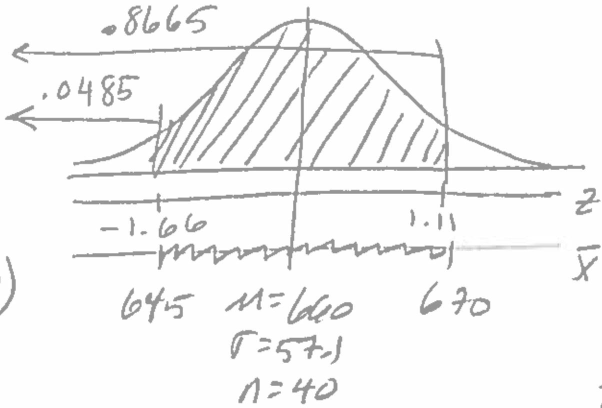
TABLE VALUES

$$z_2 = \frac{63-46}{4.1} = 4.15 \longrightarrow .9999$$

NOTE!

so $P(33 < X < 63) = .9999 - .0008$
$= \boxed{.9991}$

7. $\mu = 660$
$\sigma = 57.1$
$n = 40$
$P(645 < \bar{x} < 670)$



$z_1 = \dfrac{\bar{x} - \mu}{\sigma/\sqrt{n}}$

$= \dfrac{645 - 660}{57.1/\sqrt{40}}$

TABLE VALUES

$= -1.66 \Longrightarrow .0485$

$z_2 = \dfrac{670 - 660}{57.1/\sqrt{40}}$

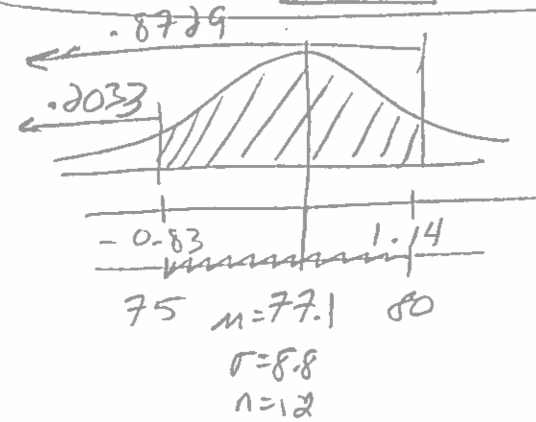
$= 1.11 \Longrightarrow .8665$

So $P(645 < \bar{x} < 670) =$

$= .8665 - .0485$

$= \boxed{.8180}$

8. $\mu = 77.1$
$\sigma = 8.8$
$n = 12$
Normally Distributed
$P(75 < \bar{x} < 80)$



$z_1 = \dfrac{\bar{x} - \mu}{\sigma/\sqrt{n}}$

$= \dfrac{75 - 77.1}{8.8/\sqrt{12}}$

TABLE VALUES

$= -0.83 \Rightarrow .2033$

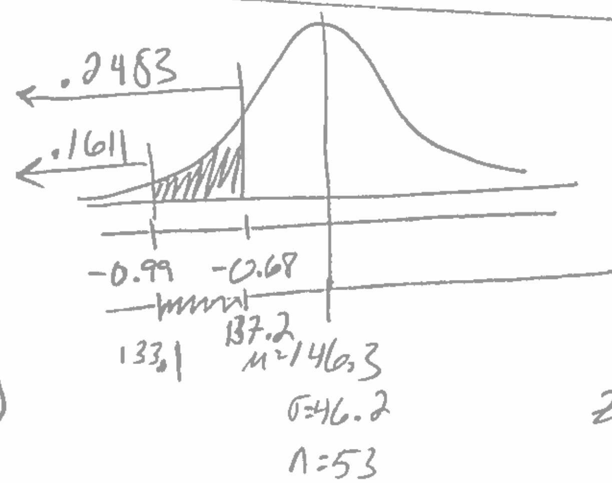
$z_2 = \dfrac{80 - 77.1}{8.8/\sqrt{12}}$

$= 1.14 \Rightarrow .8729$

So $P(75 < \bar{x} < 80) = .8729 - .2033$

$= \boxed{.6696}$

9. $\mu = 146.3$
$\sigma = 46.2$
$n = 53$
Normally Distributed
$P(133.1 < \bar{x} < 137.2)$



$z_1 = \dfrac{\bar{x} - \mu}{\sigma/\sqrt{n}}$

$= \dfrac{133.1 - 146.3}{46.2/\sqrt{12}}$

TABLE VALUE

$= -0.99 \Longrightarrow .1611$

$z_2 = \dfrac{137.2 - 146.3}{46.2/\sqrt{12}}$

$= -0.68 \Longrightarrow .2483$

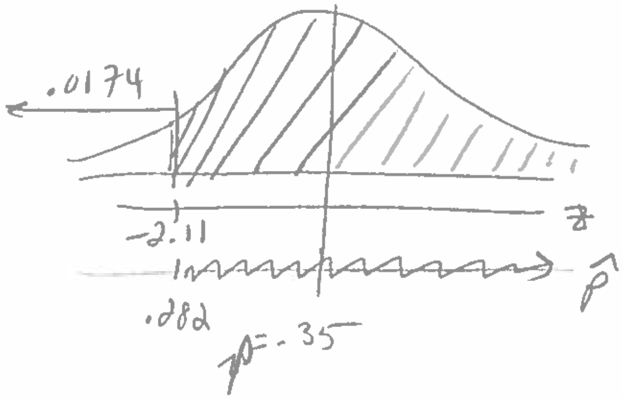
So $P(133.1 < \bar{x} < 137.2) =$

$= .2483 - .1611 = \boxed{.0872}$

II. $p = .35$

$n = 220$

(10) $P(\hat{p} > .282)$



$$z = \frac{\hat{p} - p}{\sqrt{\frac{pq}{n}}} \qquad q = 1-p = 1-.35 = .65$$

$$= \frac{.282 - .35}{\sqrt{\frac{(.35)(.65)}{220}}}$$

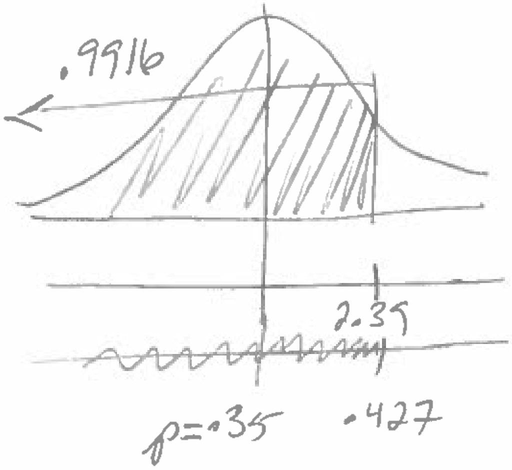
$= -2.11$ TABLE VALUE $\rightarrow .0174$

So $P(\hat{p} > .282) = 1 - .0174$

$= \boxed{.9826}$

---

(11) $P(\hat{p} < .427)$



$$z = \frac{\hat{p} - p}{\sqrt{\frac{p \cdot q}{n}}} \qquad q = 1-p$$

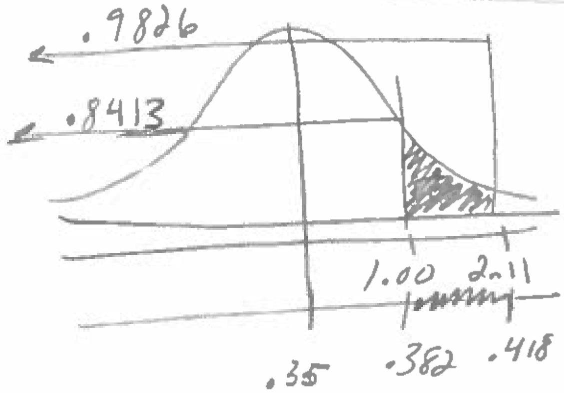
$$= \frac{.427 - .35}{\sqrt{\frac{(.35)(.65)}{220}}}$$

$= 2.39$ TABLE VALUE $z \rightarrow .9916$

So $P(\hat{p} < .427) = \boxed{.9916}$

---

(12) $P(.382 < \hat{p} < .418)$



$$z_1 = \frac{\hat{p} - p}{\sqrt{\frac{pq}{n}}} \qquad q = 1-p$$

$$= \frac{(.382) - .35}{\sqrt{\frac{(.35)(.65)}{220}}} = 0.995$$

$\Rightarrow$ use 1.00

$$z_2 = \frac{.418 - .35}{\sqrt{\frac{(.35)(.65)}{220}}}$$

$= 2.11$

TABLE VALUES

$z_1 = 1.00 \Rightarrow .8413$

$z_2 = 2.11 \Rightarrow .9826$

So

$P(.382 < \hat{p} < .418) =$

$= .9826 - .8413$

$= \boxed{.1413}$

III. $\mu = 56.8$

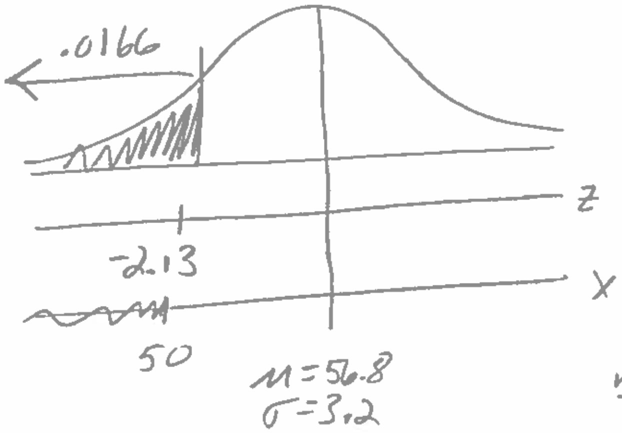
$\sigma = 3.2$

one data value

Normally distributed

NOTE!

(13) $P(X < 50)$



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

$= \frac{50-56.8}{3.2}$

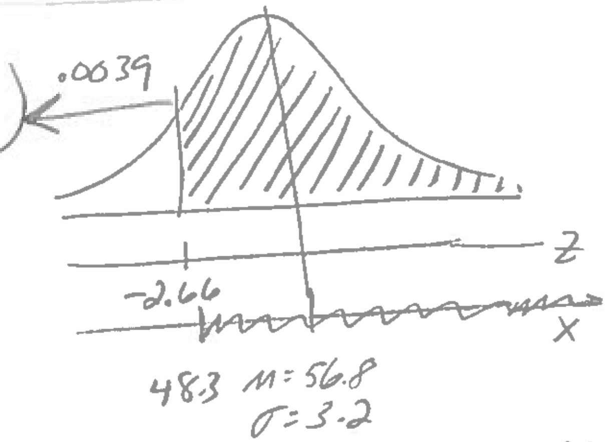
$= -2.125$

use $= -2.13$ → .0166 TABLE VALUE

so $P(X<50) = \boxed{.0166}$

---

(14) $P(X > 48.3)$



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

$= \frac{48.3-56.8}{3.2}$

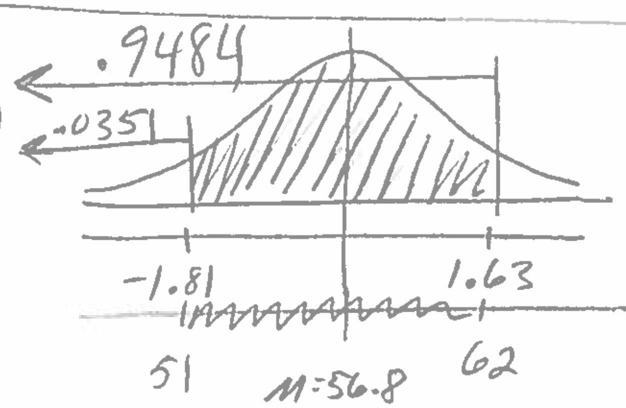
$= -2.66 \Rightarrow .0039$ TABLE VALUE

so $P(X>48.3) = 1 - .0039$

$= \boxed{.9961}$

---

(15) $P(51 < X < 62)$



$z_1 = \frac{x-\mu}{\sigma}$

$= \frac{51-56.8}{3.2}$

$= -1.81$ → .0351 TABLE VALUES

$z_2 = \frac{62-56.8}{3.2}$

$= 1.63 \Rightarrow .9484$

so $P(51<X<62) = .9484 - .0351$

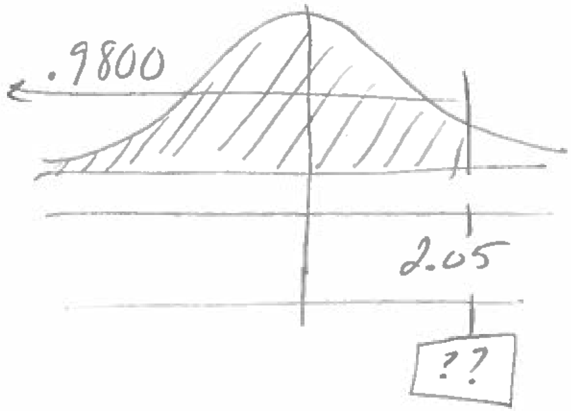
$= \boxed{.9133}$

(16) $P(X=58) = \boxed{0}$ DONE

(17) 98^{th} %-ile

with $\mu = 56.8$

$\sigma = 3.2$



.9800

.9798 .9803

CLOSER

$z = 2.05$

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

$\Rightarrow 2.05 = \frac{x-56.8}{3.2}$

$\Rightarrow x - 56.8 = (3.2)(2.05)$

$= 6.56$

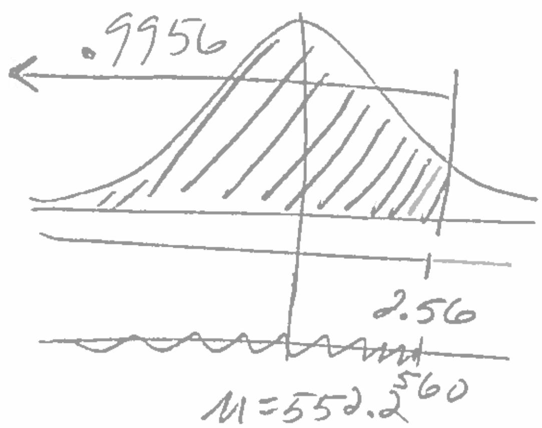
$\Rightarrow x = \boxed{63.36}$

III. $\mu = 552.2$

$\sigma = 32$

$n = 110$

(18) $P(\bar{X} < 560)$



$z = \frac{\bar{X} - \mu}{\sigma/\sqrt{n}}$

$= \frac{560 - 552.2}{32/\sqrt{110}}$

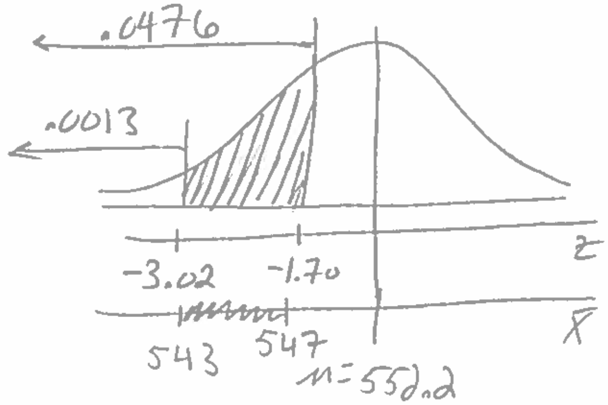
$= 2.56$

TABLE VALUE

.9948

so $P(X < 560) = \boxed{.9948}$

(19). $P(543 < \bar{x} < 547)$



$\mu = 552.2$
$\sigma = 32$
$n = 110$

$$z_1 = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} = \frac{543 - 552.2}{32/\sqrt{110}} = -3.02 \longrightarrow .0013$$

$$z_2 = \frac{547 - 552.2}{32/\sqrt{110}} = -1.70 \longrightarrow .0446$$

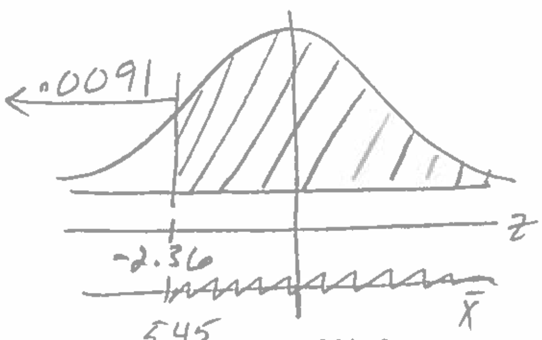
TABLE VALUES

.0013

.0446

so $P(543 < \bar{x} < 547) = .0446 - .0013 = \boxed{.0433}$

(20). $P(\bar{x} > 545)$



$\mu = 552.2$
$\sigma = 32$
$n = 110$

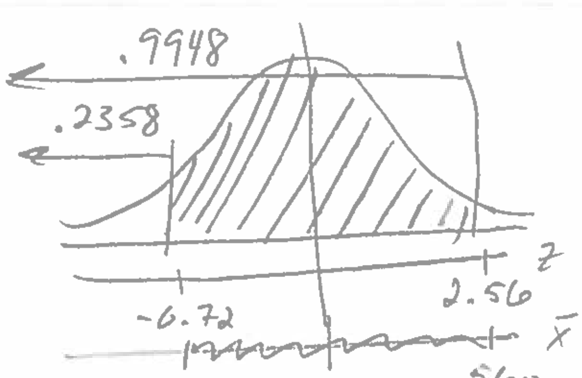
$$z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} = \frac{545 - 552.2}{32/\sqrt{110}} = -2.36 \longrightarrow .0091$$

TABLE VALUES

.0091

so $P(\bar{x} > 545) = 1 - .0091 = \boxed{.9909}$

(21) $P(550 < \bar{x} < 560)$



$\mu = 552.2$
$\sigma = 32$

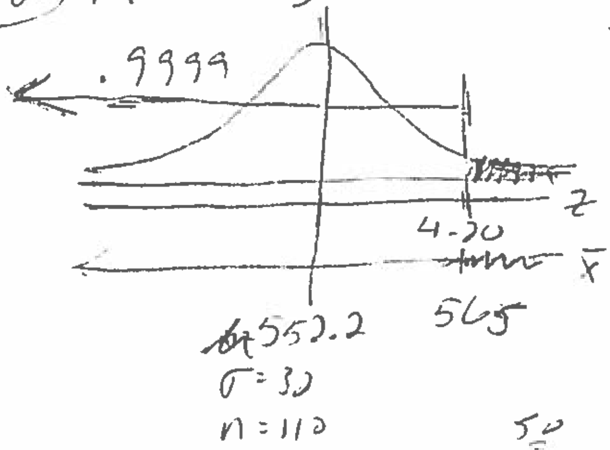
$$z_1 = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} = \frac{550 - 552.2}{32/\sqrt{110}} = -0.72 \longrightarrow .2358$$

$$z_2 = \frac{560 - 552.2}{32/\sqrt{110}} = 2.56 \longrightarrow .9948$$

TABLE VALUES	so $P(550 < \bar{x} < 560)$
.2358	$= .9948 - .2358$
.9948	$= \boxed{.7590}$

pg seven →

22) $P(\bar{X} > 565)$



$$z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} = \frac{565 - 552.2}{30/\sqrt{110}} = 4.20 \longrightarrow .9999$$

TABLE VALUE

Because it is beyond our table

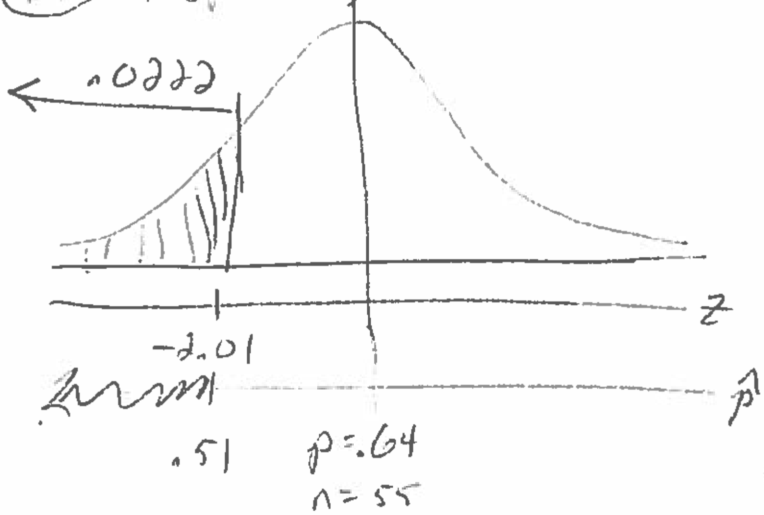
So

$$P(\bar{X} > 565) = 1 - .9999 = \boxed{.0001}$$

VI. $p = .64 \Rightarrow q = 1 - p = 1 - .64 = .36$

$n = 55$

23) $P(\hat{p} < .51)$



$$z = \frac{\hat{p} - p}{\sqrt{\frac{pq}{n}}} = \frac{.51 - .64}{\sqrt{\frac{(.64)(.36)}{55}}} = -2.01 \longrightarrow .0222$$

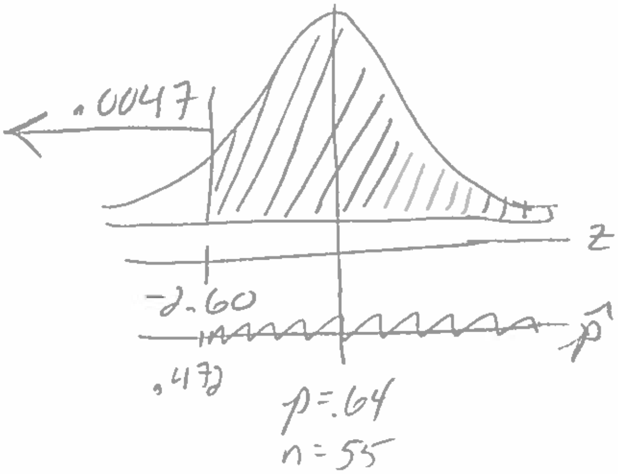
TABLE VALUE

So

$$P(\hat{p} < .51) = \boxed{.0222}$$

pg 8ight

24. $P(\hat{p} > .472)$



$$z = \frac{\hat{p} - p}{\sqrt{\frac{p \cdot q}{n}}}$$

$$= \frac{.472 - .64}{\sqrt{\frac{(.64)(.36)}{55}}}$$

TABLE VALUE

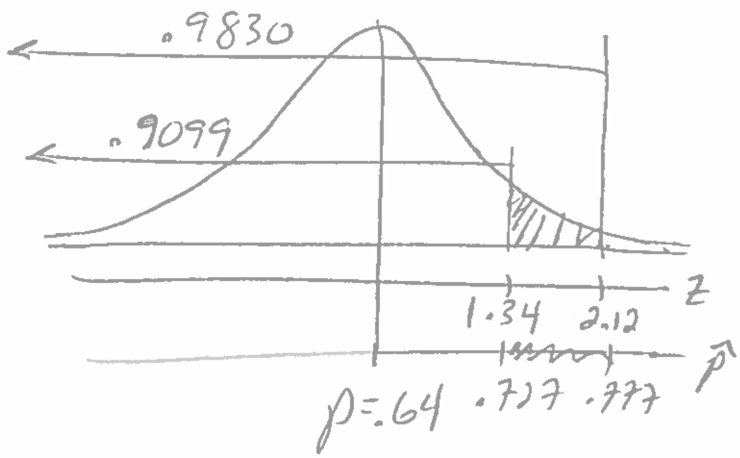
$$= -2.60 \longrightarrow .0047$$

so $P(\hat{p} > .472) = 1 - .0047$

$$= \boxed{.9953}$$

---

25. $P(.727 < \hat{p} < .777)$



$$z_1 = \frac{\hat{p} - p}{\sqrt{\frac{p \cdot q}{n}}}$$

$$= \frac{.727 - .64}{\sqrt{\frac{(.64)(.36)}{55}}}$$

TABLE VALUES

$$= 1.34 \longrightarrow .9099$$

$$z_2 = \frac{.777 - .64}{\sqrt{\frac{(.64)(.36)}{55}}}$$

$$= 2.12 \longrightarrow .9830$$

so

$P(.727 < \hat{p} < .777) =$

$$= .9830 - .9099$$

$$= \boxed{.0731}$$