Chapter 9

9.1a. 1/6

b. 1/6

9.2 a $P(\overline{X} = 1)$ =P(1,1)= 1/36

b $P(\overline{X} = 6)$ = P(6,6) = 1/36

9.3a $P(\overline{X} = 1) = (1/6)^5 = .0001286$

b $P(\overline{X} = 6) = (1/6)^5 = .0001286$

9.4 The variance of $\overline{X}$ is smaller than the variance of X.

9.5 The sampling distribution of the mean is normal with a mean of 40 and a standard deviation of $12/\sqrt{100} = 1.2$.

9.6 No, because the sample mean is approximately normally distributed.

9.7 a $P(\overline{X} > 1050) = P\left(\frac{\overline{X}-\mu}{\sigma/\sqrt{n}} > \frac{1050-1000}{200/\sqrt{16}}\right)$ = P(Z > 1.00) = .5 – P(0 < Z < 1.00) = .5 – .3413 = .1587

b $P(\overline{X} < 960) = P\left(\frac{\overline{X}-\mu}{\sigma/\sqrt{n}} < \frac{960-1000}{200/\sqrt{16}}\right)$ = P(Z < –.80) = .5 – P(0 < Z < .80) = .5 – .2881 = .2119

c $P(\overline{X} > 1100) = P\left(\frac{\overline{X}-\mu}{\sigma/\sqrt{n}} > \frac{1100-1000}{200/\sqrt{16}}\right)$ = P(Z > 2.00) = .5 – P(0 < Z < 2.00) = .5 – .4772 = .0228

9.8 a $P(\overline{X} > 1050) = P\left(\frac{\overline{X}-\mu}{\sigma/\sqrt{n}} > \frac{1050-1000}{200/\sqrt{25}}\right)$ = P(Z > 1.25) = .5 – P(0 < Z < 1.25) = .5 – .3944 = .1056

b $P(\overline{X} < 960) = P\left(\frac{\overline{X}-\mu}{\sigma/\sqrt{n}} < \frac{960-1000}{200/\sqrt{25}}\right)$ = P(Z < –1.00) = .5 – P(0 < Z < 1.00) = .5 – .3413 = .1587

c $P(\overline{X} > 1100) = P\left(\frac{\overline{X}-\mu}{\sigma/\sqrt{n}} > \frac{1100-1000}{200/\sqrt{25}}\right)$ = P(Z > 2.50) = .5 – P(0 < Z < 2.50) = .5 – .4938 = .0062

9.9 a $P(\overline{X} > 1050) = P\left(\frac{\overline{X}-\mu}{\sigma/\sqrt{n}} > \frac{1050-1000}{200/\sqrt{100}}\right)$ = P(Z > 2.50) = .5 – P(0 < Z < 2.50) = .5 – .4938 = .0062 b $P(\overline{X} < 960) = P\left(\frac{\overline{X}-\mu}{\sigma/\sqrt{n}} < \frac{960-1000}{200/\sqrt{100}}\right)$ = P(Z < –2.00) = .5 – P(0 < Z < 2.00) = .5 – .4772 = .0228

c $P(\overline{X} > 1100) = P\left(\frac{\overline{X}-\mu}{\sigma/\sqrt{n}} > \frac{1100-1000}{200/\sqrt{100}}\right)$ = P(Z > 5.00) = 0

9.10 a $P(49 < \overline{X} < 52) = P\left(\frac{49-50}{5/\sqrt{4}} < \frac{\overline{X}-\mu}{\sigma/\sqrt{n}} < \frac{52-50}{5/\sqrt{4}}\right)$ = P(–.40 < Z < .80)

= P(0 < Z < .40) + P(0 < Z < .80) = .1554 + .2881 = .4435

b $P(49 < \overline{X} < 52) = P\left(\frac{49-50}{5/\sqrt{16}} < \frac{\overline{X}-\mu}{\sigma/\sqrt{n}} < \frac{52-50}{5/\sqrt{16}}\right)$ = P(–.80 < Z < 1.60)

= P(0 < Z < .80) + P(0 < Z < 1.60) = .2881 + .4452 = .7333

c $P(49 < \overline{X} < 52) = P\left(\frac{49-50}{5/\sqrt{25}} < \frac{\overline{X}-\mu}{\sigma/\sqrt{n}} < \frac{52-50}{5/\sqrt{25}}\right)$ = P(–1.00 < Z < 2.00)

= P(0 < Z < 1.00) + P(0 < Z < 2.00) = .3413 + .4772 = .8185

9.11 a $P(49 < \overline{X} < 52) = P\left(\frac{49-50}{10/\sqrt{4}} < \frac{\overline{X}-\mu}{\sigma/\sqrt{n}} < \frac{52-50}{10/\sqrt{4}}\right)$ = P(–.20 < Z < .40)

= P(0 < Z < .20) + P(0 < Z < .40) = .0793 + .1554 = .2347

b $P(49 < \overline{X} < 52) = P\left(\frac{49-50}{10/\sqrt{16}} < \frac{\overline{X}-\mu}{\sigma/\sqrt{n}} < \frac{52-50}{10/\sqrt{16}}\right)$ = P(–.40 < Z < .80)

= P(0 < Z < .40) + P(0 < Z < .80) = .1554 + .2881 = .4435

c $P(49 < \overline{X} < 52) = P\left(\frac{49-50}{10/\sqrt{25}} < \frac{\overline{X}-\mu}{\sigma/\sqrt{n}} < \frac{52-50}{10/\sqrt{25}}\right)$ = P(–.50 < Z < 1.00)

= P(0 < Z < .50) + P(0 < Z < 1.00) = .1915 + .3413 = .5328

9.12 a $P(49 < \overline{X} < 52) = P\left(\frac{49-50}{20/\sqrt{4}} < \frac{\overline{X}-\mu}{\sigma/\sqrt{n}} < \frac{52-50}{20/\sqrt{4}}\right)$ = P(–.10 < Z < .20)

= P(0 < Z < .10) + P(0 < Z < .20) = .0398 + .0793 = .1191

b $P(49 < \overline{X} < 52) = P\left(\frac{49-50}{20/\sqrt{16}} < \frac{\overline{X}-\mu}{\sigma/\sqrt{n}} < \frac{52-50}{20/\sqrt{16}}\right)$ = P(–.20 < Z < .40)

= P(0 < Z < .20) + P(0 < Z < .40) = .0793 + .1554 = .2347

c $P(49 < \overline{X} < 52) = P\left(\frac{49-50}{20/\sqrt{25}} < \frac{\overline{X}-\mu}{\sigma/\sqrt{n}} < \frac{52-50}{20/\sqrt{25}}\right)$ = P(–.25 < Z < .50)

= P(0 < Z < .25) + P(0 < Z < .50) = .0987 + .1915 = .2902

9.13 a $\sqrt{\frac{N-n}{N-1}} = \sqrt{\frac{1,000-100}{1,000-1}} = .9492$

b $\sqrt{\frac{N-n}{N-1}} = \sqrt{\frac{3,000-100}{3,000-1}} = .9834$

c $\sqrt{\frac{N-n}{N-1}} = \sqrt{\frac{5,000-100}{5,000-1}} = .9900$

d. The finite population correction factor is approximately 1.

9.14 a $\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}\sqrt{\frac{N-n}{N-1}} = \frac{500}{\sqrt{1,000}}\sqrt{\frac{10,000-1,000}{10,000-1}} = 15.00$

b $\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}\sqrt{\frac{N-n}{N-1}} = \frac{500}{\sqrt{500}}\sqrt{\frac{10,000-500}{10,000-1}} = 21.80$

c $\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}\sqrt{\frac{N-n}{N-1}} = \frac{500}{\sqrt{100}}\sqrt{\frac{10,000-100}{10,000-1}} = 49.75$

9.15 a $P(X > 168) = P\left(\frac{X-\mu}{\sigma} > \frac{168-163}{5}\right) = P(Z > 1.00) = .5 - P(0 < Z < 1.00) = .5 - .3413 = .1587$

b $P(\bar{X} > 168) = P\left(\frac{\bar{X}-\mu}{\sigma/\sqrt{n}} > \frac{168-163}{5/\sqrt{4}}\right) = P(Z > 2.00) = 5 - P(0 < Z < 2.00) = .5 - .4772 = .0228$

c $P(\bar{X} > 168) = P\left(\frac{\bar{X}-\mu}{\sigma/\sqrt{n}} > \frac{168-163}{2/\sqrt{100}}\right) = P(Z > 10.00) = 0$

9.16 We can answer part (c) and possibly part (b) depending on how nonnormal the population is.

9.17 a $P(X > 120) = P\left(\frac{X-\mu}{\sigma} > \frac{120-117}{6.1}\right) = P(Z > 0.49) = .5 - P(0 < Z < .49) = .5 - .1879 = .3121$

b $P(\bar{X} > 120) = P\left(\frac{\bar{X}-\mu}{\sigma/\sqrt{n}} > \frac{120-117}{6.1/\sqrt{4}}\right) = P(Z > .98) = .5 - P(0 < Z < .98) = .5 - .3365 = .1635$

c $[P(X > 120)]^4 = [.3121]^4 = .00949$

9.18 a $P(X > 12) = P\left(\frac{X-\mu}{\sigma} > \frac{12-10}{3}\right) = P(Z > .67) = .5 - P(0 < Z < .67) = .5 - .2486 = .2514$

b $P(\bar{X} > 275/25) = P(\bar{X} > 11) = P\left(\frac{\bar{X}-\mu}{\sigma/\sqrt{n}} > \frac{11-10}{3/\sqrt{25}}\right) = P(Z > 1.67) = .5 - P(0 < Z < 1.67)$

$= .5 - .4525 = .0475$

9.19 a $P(X > 60) = P\left(\frac{X-\mu}{\sigma} > \frac{60-50}{8}\right)$ = P(Z > 1.25) = .5 – P(0 < Z < 1.25) = .5 – .3944 = .1056

b $P(\overline{X} > 60) = P\left(\frac{\overline{X}-\mu}{\sigma/\sqrt{n}} > \frac{60-50}{8/\sqrt{3}}\right)$ = P(Z > 2.17) = .5 – P(0 < Z < 2.17) = .5 – .4850 = .0150

c $[P(X > 60)]^3 = [.1056]^3 = .00118$

9.20 a $P(X < 75) = P\left(\frac{X-\mu}{\sigma} < \frac{75-78}{6}\right)$ = P(Z < –.50) = .5 – P(0 < Z < .50) = .5 – .1915 = .3085

b $P(\overline{X} < 75) = P\left(\frac{\overline{X}-\mu}{\sigma/\sqrt{n}} < \frac{75-78}{6/\sqrt{50}}\right)$ = P(Z < –3.54) = .5 – P(0 < Z < 3.54) = .5 – .5 = 0

9.21 a $P(X > 6) = P\left(\frac{X-\mu}{\sigma} > \frac{6-5}{1.5}\right)$ = P(Z > .67) = .5 – P(0 < Z < .67) = .5 – .2486 = .2514

b $P(\overline{X} > 6) = P\left(\frac{\overline{X}-\mu}{\sigma/\sqrt{n}} > \frac{6-5}{1.5/\sqrt{5}}\right)$ = P(Z > 1.49) = .5 – P(0 < Z < 1.49) = .5 – .4319 = .0681

c $[P(X > 7)]^5 = [.2514]^5 = .00100$

9.22 $P(\overline{X} > 10{,}000/16) = P(\overline{X} > 625) = P\left(\frac{\overline{X}-\mu}{\sigma/\sqrt{n}} > \frac{625-600}{200/\sqrt{16}}\right)$ = P(Z > .50)

= .5 – P(0 < Z < .50) = .5 – .1915 = .3085

9.23 a $P(\overline{X} < 5.97) = P\left(\frac{\overline{X}-\mu}{\sigma/\sqrt{n}} < \frac{5.97-6.05}{.18/\sqrt{36}}\right)$ = P(Z < –2.67) = .5 – P(0 < Z < 2.67) = .5 – .4962 = .0038

b It appears to be false.

9.24 The professor needs to know the mean and standard deviation of the population of the weights of elevator users and that the distribution is not extremely nonnormal.

9.25 $P(\overline{X} > 1{,}140/16) = P(\overline{X} > 71.25) = P\left(\frac{\overline{X}-\mu}{\sigma/\sqrt{n}} > \frac{71.25-75}{10/\sqrt{16}}\right)$ = P(Z > –1.50)

= .5 + P(0 < Z < 1.50) = .5 + .4332 = .9332

9.26 P(Total time > 300) = $P(\overline{X} > 300/60) = P(\overline{X} > 5) = P\left(\frac{\overline{X}-\mu}{\sigma/\sqrt{n}} > \frac{5-4.8}{1.3/\sqrt{60}}\right)$ = P(Z > 1.19)

= .5 – P(0 < Z < 1.19) = .5 – .3830 = .1170

9.27, No because the central limit theorem says that the sample mean is approximately normally distributed.

9.28 P(Total number of faxes > 1500) = $P(\overline{X} > 1500/5) = P(\overline{X} > 300) = P\left(\frac{\overline{X}-\mu}{\sigma/\sqrt{n}} > \frac{300-275}{75/\sqrt{5}}\right)$

= P(Z > .75) = .5 – P(0 < Z < .75) = .5 – .2734 = .2266

9.29 P(Total number of cups > 225) = $P(\overline{X} > 225/125) = P(\overline{X} > 1.80) = P\left(\frac{\overline{X}-\mu}{\sigma/\sqrt{n}} > \frac{1.80-1.7}{.5/\sqrt{125}}\right)$

= P(Z > 2.24) = . 5 – P(0 < Z < 2.24) = 5 – .4875 = .0125

9.30a $P(\hat{P} > .60) = P\left(\frac{\hat{P}-p}{\sqrt{p(1-p)/n}} > \frac{.60-.5}{\sqrt{(.5)(1-.5)/300}}\right)$ = P(Z > 3.46) = 0

b. $P(\hat{P} > .60) = P\left(\frac{\hat{P}-p}{\sqrt{p(1-p)/n}} > \frac{.60-.55}{\sqrt{(.55)(1-.55)/300}}\right)$ = P(Z > 1.74) = .5 – P(0 < Z < 1.74) = .5 – .4591

= .0409

c. $P(\hat{P} > .60) = P\left(\frac{\hat{P}-p}{\sqrt{p(1-p)/n}} > \frac{.60-.6}{\sqrt{(.6)(1-.6)/300}}\right)$ = P(Z > 0) = .5

9.31a $P(\hat{P} < .22) = P\left(\frac{\hat{P}-p}{\sqrt{p(1-p)/n}} > \frac{.22-.25}{\sqrt{(.25)(1-.25)/500}}\right)$ = P(Z < –1.55) = .5 – P(0 < Z < 1.55)

= .5 – .4394 = .0606

b. $P(\hat{P} < .22) = P\left(\frac{\hat{P}-p}{\sqrt{p(1-p)/n}} > \frac{.22-.25}{\sqrt{(.25)(1-.25)/800}}\right)$ = P(Z < –1.96) = .5 – P(0 < Z < 1.96) = .5 – .4750

= .0250

c. $P(\hat{P} < .22) = P\left(\frac{\hat{P}-p}{\sqrt{p(1-p)/n}} > \frac{.22-.25}{\sqrt{(.25)(1-.25)/1000}}\right)$ = P(Z < –2.19) = .5 – P(0 < Z < 2.19) = .5 – .4857

= .0143

9.32 $P(\hat{P} < .75) = P\left(\frac{\hat{P}-p}{\sqrt{p(1-p)/n}} > \frac{.75-.80}{\sqrt{(.80)(1-.80)/100}}\right)$ = P(Z < –1.25) = .5 – P(0 < Z < 1.25)

= .5 – .3944 = .1056

9.33 $P(\hat{P} > .35) = P\left(\frac{\hat{P}-p}{\sqrt{p(1-p)/n}} > \frac{.35-.40}{\sqrt{(.40)(1-.40)/60}}\right)$ = P(Z > –.79) = .5 + P(0 < Z < .79) = .5 + .2852

= .7852

9.34 $P(\hat{P} < .49) = P\left(\frac{\hat{P}-p}{\sqrt{p(1-p)/n}} < \frac{.49-.52}{\sqrt{(.52)(1-.52)/500}}\right)$ = P(Z < –1.34) = .5 – P(0 < Z < 1.34)

= .5 – .4099 = .0901

9.35 $P(\hat{P} > .05) = P\left(\frac{\hat{P}-p}{\sqrt{p(1-p)/n}} > \frac{.05-.03}{\sqrt{(.03)(1-.03)/800}}\right)$ = P(Z > 3.32) = 0;

The defective appears to be larger than 3%.

9.36 a $P(\hat{P} < .50) = P\left(\frac{\hat{P}-p}{\sqrt{p(1-p)/n}} < \frac{.50-.52}{\sqrt{(.52)(1-.52)/400}}\right)$ = P(Z < –.80) = .5 – P(0 < Z < .80)

= .5 – .2881 = .2119; the claim may be true.

b $P(\hat{P} < .50) = P\left(\frac{\hat{P}-p}{\sqrt{p(1-p)/n}} < \frac{.50-.52}{\sqrt{(.52)(1-.52)/1{,}000}}\right)$ = P(Z < –1.27) = .5 – P(0 < Z < 1.27)

= .5 – .3980 = .1020; the claim may be true.

9.37 $P(\hat{P} > .20) = P\left(\frac{\hat{P}-p}{\sqrt{p(1-p)/n}} > \frac{.20-.24}{\sqrt{(.24)(1-.24)/100}}\right)$ = P(Z > –.94)

= .5 + P(0 < Z < .94)= .5 + .3264 = .8264

9.38 $P(\hat{P} > .05) = P\left(\frac{\hat{P}-p}{\sqrt{p(1-p)/n}} > \frac{.05-.03}{\sqrt{(.03)(1-.03)/400}}\right)$ = P(Z > 2.34) = .5 – P(0 < Z < 2.34) = .5 – .4904

= .0096; the commercial appears to be dishonest

9.39 $P(\hat{P} > .22) = P\left(\frac{\hat{P}-p}{\sqrt{p(1-p)/n}} > \frac{.22-.20}{\sqrt{(.20)(1-.20)/1{,}000}}\right)$ = P(Z > 1.58) = .5 – P(0 < Z < 1.58)

= .5 – .4429 = .0571

9.40 a $P(\hat{P} < .45) = P\left(\frac{\hat{P}-p}{\sqrt{p(1-p)/n}} < \frac{.45-.50}{\sqrt{(.50)(1-.50)/600}}\right)$ = P(Z < –2.45) = .5 – P(0 < Z < 2.45)

= .5 – .4929 = .0071

b The claim appears to be false.

9.41 $P(\hat{P} < .55) = P\left(\frac{\hat{P}-p}{\sqrt{p(1-p)/n}} < \frac{.55-.60}{\sqrt{(.60)(1-.60)/480}}\right)$ = P(Z < –2.24) = .5 – P(0 < Z < 2.24)

= .5 – .4875 = .0125

9.42 $P(\hat{P} < .75) = P\left(\frac{\hat{P}-p}{\sqrt{p(1-p)/n}} < \frac{.75-.80}{\sqrt{(.80)(1-.80)/350}}\right)$ = P(Z < –2.34)

= .5 – P(0 < Z < 2.34)= .5 – .4904 = .0096

9.43 $P(\hat{P} > .28) = P\left(\frac{\hat{P}-p}{\sqrt{p(1-p)/n}} > \frac{.28-.25}{\sqrt{(.25)(1-.25)/1200}}\right)$ = P(Z > 2.40)

= .5 – P(0 < Z < 2.40)= .5 – .4918 = .0082

9.44 The claim appears to be false.

9.45 $P(\overline{X}_1 - \overline{X}_2 > 25) = P\left(\frac{(\overline{X}_1 - \overline{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}} > \frac{25-(280-270)}{\sqrt{\frac{25^2}{10} + \frac{30^2}{10}}}\right)$ = P(Z > 1.21) = .5 – P(0 < Z < 1.21)

= .5 – .3869 = .1131

9.46 $P(\overline{X}_1 - \overline{X}_2 > 25) = P\left(\frac{(\overline{X}_1 - \overline{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}} > \frac{25-(280-270)}{\sqrt{\frac{25^2}{50} + \frac{30^2}{50}}}\right)$ = P(Z > 2.72) = .5 – P(0 < Z < 2.72)

= .5 – .4967 = .0033

9.47 $P(\overline{X}_1 - \overline{X}_2 > 25) = P\left(\frac{(\overline{X}_1 - \overline{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}} > \frac{25-(280-270)}{\sqrt{\frac{25^2}{100} + \frac{30^2}{100}}}\right)$ = P(Z > 3.84) = 0

9.48 $P(\overline{X}_1 - \overline{X}_2 > 0) = P\left(\frac{(\overline{X}_1 - \overline{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}} > \frac{0-(40-38)}{\sqrt{\frac{6^2}{25} + \frac{8^2}{25}}}\right)$ = P(Z > –1.00) = .5 + P(0 < Z < 1.00)

= .5 + .3413 = .8413

9.49 $P(\overline{X}_1 - \overline{X}_2 > 0) = P\left(\dfrac{(\overline{X}_1 - \overline{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\dfrac{\sigma_1^2}{n_1} + \dfrac{\sigma_2^2}{n_2}}} > \dfrac{0 - (40 - 38)}{\sqrt{\dfrac{12^2}{25} + \dfrac{16^2}{25}}}\right)$ = P(Z > –.50) = .5 + P(0 < Z < .50)

= .5 + .1915 = .6915

9.50 $P(\overline{X}_1 - \overline{X}_2 > 0) = P\left(\dfrac{(\overline{X}_1 - \overline{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\dfrac{\sigma_1^2}{n_1} + \dfrac{\sigma_2^2}{n_2}}} > \dfrac{0 - (140 - 138)}{\sqrt{\dfrac{6^2}{25} + \dfrac{8^2}{25}}}\right)$ = P(Z > –1.00) = .5 + P(0 < Z < 1.00)

= .5 + .3413 = .8413

9.51 $P(\overline{X}_1 - \overline{X}_2 > 0) = P\left(\dfrac{(\overline{X}_1 - \overline{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\dfrac{\sigma_1^2}{n_1} + \dfrac{\sigma_2^2}{n_2}}} > \dfrac{0 - (75 - 65)}{\sqrt{\dfrac{20^2}{5} + \dfrac{21^2}{5}}}\right)$ = P(Z > –.77)

= .5 + P(0 < Z < .77) = .5 + .2794 = .7794

9.52 $P(\overline{X}_1 - \overline{X}_2 > 0) = P\left(\dfrac{(\overline{X}_1 - \overline{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\dfrac{\sigma_1^2}{n_1} + \dfrac{\sigma_2^2}{n_2}}} > \dfrac{0 - (73 - 77)}{\sqrt{\dfrac{12^2}{4} + \dfrac{10^2}{4}}}\right)$ = P(Z > .51) = .5 – P(0 < Z < .51)

= .5 – .1950 = .3050

9.53 $P(\overline{X}_1 - \overline{X}_2 > 0) = P\left(\dfrac{(\overline{X}_1 - \overline{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\dfrac{\sigma_1^2}{n_1} + \dfrac{\sigma_2^2}{n_2}}} > \dfrac{0 - (18 - 15)}{\sqrt{\dfrac{3^2}{10} + \dfrac{3^2}{10}}}\right)$ = P(Z > –2.24) = .5 + P(0 < Z < 2.24)

= .5 + .4875 = .9875

9.54 $P(\overline{X}_1 - \overline{X}_2 < 0) = P\left(\dfrac{(\overline{X}_1 - \overline{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\dfrac{\sigma_1^2}{n_1} + \dfrac{\sigma_2^2}{n_2}}} < \dfrac{0 - (10 - 15)}{\sqrt{\dfrac{3^2}{25} + \dfrac{3^2}{25}}}\right)$ = P(Z < 5.89) = 1