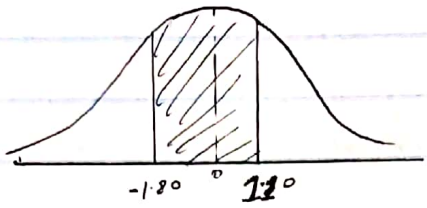
Question 1.

(a) Between $z = 1.10$ and $z = -1.80$

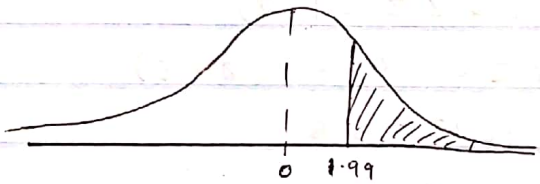


$= P(-1.80 < z < 1.10)$

$= 0.8643 - 0.0359$

$= 0.8284$

(b) To the right of $z = 1.99$

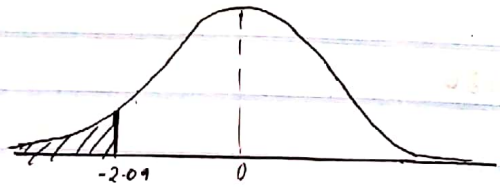


$P(z > 1.99) = 1 - P(z < 1.99)$

$= 1 - 0.9767$

$= 0.0233$

(c) To the left of $z = -2.09$



$= P(z < -2.09) = 0.0183$

Question 3

$\bar{x} = 476$

$s = 22$

(a) Between 476 and 500 passengers

$$Z(500) = \frac{500 - 476}{22} = 1.09$$

$$Z(476) = \frac{476 - 476}{22} = 0.00$$

$$P(476 < n < 500) = P(0 < Z < 1.09)$$
$$= P(Z < 1.09) - P(Z < 0)$$
$$= 0.8621 - 0.5$$
$$= 0.3621$$

(b) Fewer than 450 passengers

$$Z(450) = \frac{450 - 476}{22} = -1.18$$

$$P(Z < -1.18) = 0.1190$$

(c) More than 510 passengers

$$Z(510) = \frac{510 - 476}{22} = 1.55$$

$$P(Z > 1.55) = 1 - P(Z < 1.55)$$
$$= 1 - 0.9394$$
$$= 0.0606$$

Question 3

$\Sigma x = 13000$

$n = 27$

$\bar{x} = \frac{13000}{27} = 481.481$

$s = \sqrt{\frac{724040.7407}{27}} = 163.757$

Median = 460

$Sk = 3\left(\frac{481.481 - 460}{163.757}\right) = 0.3935$

False. A skewness of 0.3935 indicates that the distribution is moderately skewed.

Question 4

$\bar{x} = 36 \qquad n = 35$

$s = 3.6$

Probability that the mean of the sample is between 34 and 37.5

$Z(34) = \frac{34 - 36}{3.6 \div \sqrt{35}} = -3.29$

$Z(37.5) = \frac{37.5 - 36}{3.6 \div \sqrt{35}} = 2.47$

$= P(-3.29 < z < 2.47)$

$= P(z < 2.47) - P(z < -3.29)$

$= 0.9932 - 0.0005$

$= 0.9927$

Question 5

$p = 0.22$

$n = 200$

$q = 1 - 0.22 = 0.78$

$X = 30$

$\mu = np = 200 \times 0.22 = 44$

$\sigma = \sqrt{npq} = \sqrt{200 \times 0.22 \times 0.78} = 5.858$

$= P(X > 30) = P(X > 30.5)$

$$z(30.5) = \frac{30.5 - 44}{5.858} = -2.30$$

$P(z > -2.30) = 1 - P(z < -2.30)$

$= 1 - 0.0007$

$= 0.9993$

Question 6

(a) 75% $(1 - 0.75)/2 = 0.125$

Area btw 0 and Z-score: 0.125

Z-score = 1.150

(b) 80% $(1 - .80)/2 = 0.1$

Area btw 0 and Z-score = 0.1

Z-score = 1.282

(c) 85%

Area between 0 and z-score: $(1 - 0.85)/2 = 0.075$

Z-score = 1.440

(d) 95%

$(1 - 0.95)/2 = 0.025$

Z-score = 1.96

(e) 99%

Area between 0 and z-score = 0.005

Z-score = 2.58

Question 7

$$MOE = \frac{14.89 - 12.67}{2}$$

$$= 1.11$$

Question 8

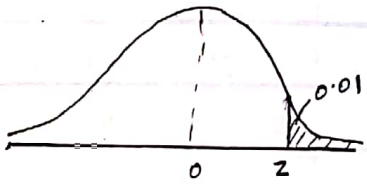
(a) $\alpha = 0.01$, right tailed test

Area between 0 and Z-score $\Rightarrow 0.5 - 0.01$

$= 0.49$

$P = 0.5 + 0.49 = 0.99$

Z-score $= 2.63$

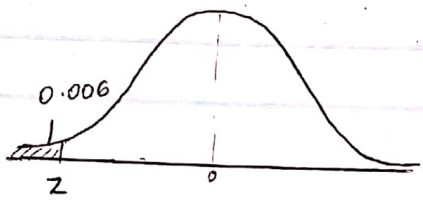


(b) $\alpha = 0.006$, left tailed test

Area between 0 and Z-score $\Rightarrow 0.5 - 0.006 = 0.494$

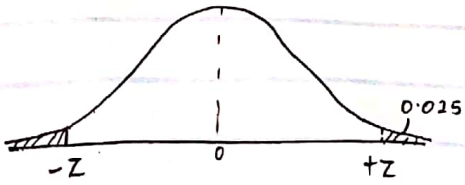
$P = 0.006 \Rightarrow 0.5 - 0.494$

$= -2.51$



(c) $\alpha = 0.05$, two tailed test

Lower z & upper z



$\frac{0.05}{2} = 0.025$

$P = 0.025$ and $(1 - 0.025)$

Z-score $= -1.96$ and 1.96

Question 9

H_0: $\mu = 338$

H_a: $\mu > 338$

$\alpha = 0.05$

$Z_c = \pm 1.64$

Rejection region: $|Z| > 1.64$

$$Z = \frac{350 - 338}{43.2 \div \sqrt{50}} = 1.964$$

$Z = 1.964 > Z_c = 1.64$. The null hypothesis is rejected

It can be concluded that there is significant evidence to conclude that the mean number of friends is greater than 338

Question 10

H_0: $\mu = 2.27$

H_a: $\mu \neq 2.27$

$\alpha = 0.05$

$t_c = \pm 2.093$

Rejection region: $|t| > 2.093$

$$t = \frac{2.98 - 2.27}{0.98 \div \sqrt{20}} = 3.24$$

$t = 3.24 > t_c = 2.093$. The null hypothesis is rejected

It can be concluded that the average differs from the population average.