Pg 211

1. a) Each individual has equal chance of being selected
   b) Probability is constant for all selections

2. This is drawing a sampling unit from a finite population and returning it to that population. Used to find probability with replacement

3. 32 freshmen
   48 sophomores
   Total = 48 + 32 = 80 (sample space) = n
   a) $32/80 = 2/5$

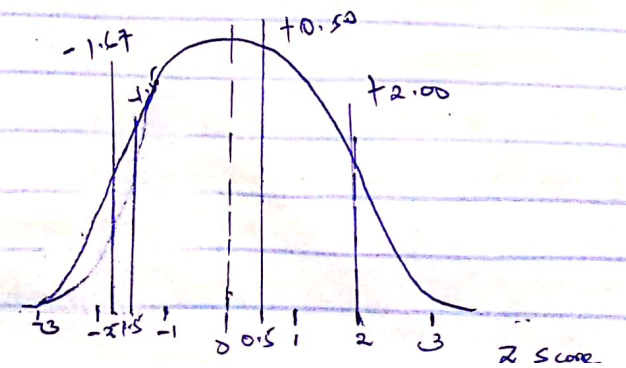
   b) n = 6
   ∴ sophomores
   Remaining sophomores = 48 − 5 = 43
   Total = 43 + 32 = 75
   P(Freshman) = 32/75

   c) When 10 sophomore students join the class
   New Total = 32 + 48 + 10 − 5 = 85
   P(Freshman) = 32/85

4. a) 1/6

   b) P(6) + P(1) = 1/6 + 1/6 = 2/6

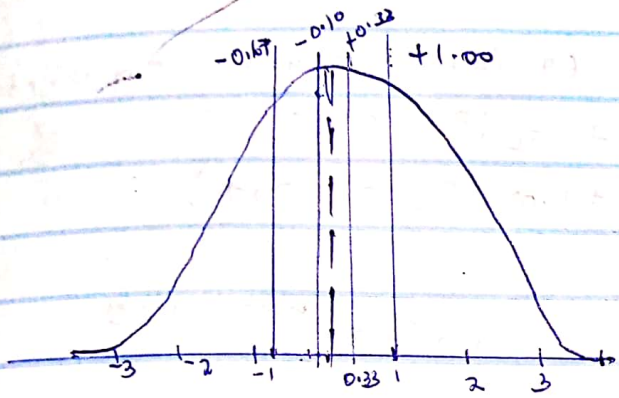
   c) P'(6) = 1 − P(6) = 1 − 1/6 = 5/6

5. 

All left tail

a) +2.00 = 97.725 %
b) +0.50 = 0.6914 = 69.14 %
c) -1.50 = 6.6807 %
d) -1.67 = 4.7459 %.

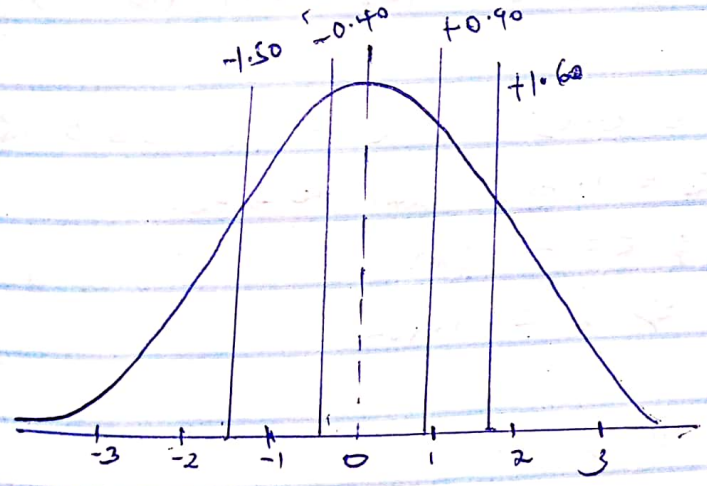
6



~~Using a left tail~~

a) +1.00 ~~Right~~ tail P value = 0.1586
b) +0.33 Right tail P value = 0.3707
c) -0.10 Left tail P value = 0.4602
d) -0.67 Left tail P value = 0.2514

7.



a) +1.60 Left tail 0.9452
b) +0.90 Right tail 0.1841
c) -1.50 Right tail 0.9331
d) -0.40 Right tail 0.6554

8. a) $P(Z > +2.00) = 0.02275$

b) $P(Z > -1.00) = 0.8413$

c) $P(Z < +0.500) = 0.69146$

d) $P(Z < 1.500) = 0.9332$

9. a) $z = +1.64$ and $z = +1.64$ $(P = 0.899)$ Two tailed analysis

b) $z = -1.96$ and $z = +1.96$ $(P = 0.95)$ "

c) $z = -1.00$ and $z = +1.00$ $(P = 0.6827)$ "

10. a) $P(-1.80 < z < 0.20)$ $P = 0.5433$ which is given by

b) $P(-0.140 < z < 1.40)$

c) $P(0.25 < z < 1.25)$

d) $P(-0.90 < z < -0.60)$

a) $P(0.20) - P(-1.80) = 0.5792 - 0.3359 = 0.2434$

b) $P(1.40) - P(-0.40) = 0.9192 - 0.3446 = 0.5746$

c) $P(1.25) - P(0.25) = 0.89435 - 0.59871 = 0.29564$

d) $P(-0.60) - P(-0.90) = 0.27425 - 0.18406 = 0.09019$

11. a) P value from right $= 0.05$ therefore P from left $= 0.95$

$P(0.95) \Rightarrow z = 1.645$ from the tables

b) $P(Z < z) = 0.12 \Rightarrow z = -0.842$

c) $P(Z < z) = 0.10 \Rightarrow z = -1.282$

d) $P(Z < z) = 0.50 \Rightarrow z = 0$

12. a) $P(0.10)$ two tailed $z = \pm(0.126)2$

Therefore $z = (-0.126, z = +0.126)2 = -0.253 - 0.253$

b) $P(0.125)$ two tailed $\Rightarrow z = \pm 0.319$

Therefore $z = -0.319, z = +0.319$

c) $P(0.35)$ 2 tailed $\Rightarrow z = \pm 1.036$

Therefore $z = -1.036 - +1.036$

d) $P(0.05)$ 2 tailed $\Rightarrow z = \pm 1.645$

Therefore $z = -1.645$ to 1.645

13. (a) $P(0.475)$ two tailed $z = \pm 1.96$

(b) $P(0.50)$ two tailed $z = \pm 0.674$

(c) $P(0.375)$ two tailed $z = \pm 1.15$

(d) $P(0.30)$ two tailed $z = \pm 0.842$

15. $\mu = 70$

$\sigma = 12$

a) $X = 74$ $z = \frac{X-\mu}{\sigma} = \frac{74-70}{12} = 0.333$ To the right

Proportion $P(X>z) = 0.1306$

b) $X = 84$ $z = \frac{X-\mu}{\sigma} = \frac{84-70}{12} = 1.1667$, to the right,

$P(Z>1.1667) = 0.37838$

c) $X = 54$

$$z = \frac{X - \mu}{\sigma} = \frac{54 - 70}{12} = -1.333$$

$$P(z < Z < 0) = 0.4087$$

d) $X = 58$

$$z = \frac{X - \mu}{\sigma} = \frac{58 - 70}{12} = -1$$

$$P(-1 < z < 0) = 0.34134$$

14. $\mu = 50$

$\sigma = 5$

a) $X = 45 \quad z = \frac{45 - 50}{5} = -1$

$$P(-1 < z < 0) = 0.34134$$

b) $X = 35$

$$z = \frac{35 - 50}{5} = -3 \quad \#$$

$$P(-3 < z < 0) = 0.49865$$

c) $X = 55$

$$z = \frac{55 - 50}{5} = 1 \Rightarrow P(0 < x < z) = 0.34134$$

d) $X = 60$

$$z = \frac{60 - 50}{5} = 2 \Rightarrow P(0 < x < 2) = 0.47725$$

16. $\mu = 85 \quad \sigma = 20$

a) $X > 89$

$$z = \frac{X - \mu}{\sigma} = \frac{89 - 85}{20} = 0.2$$

$$P(x > z) = 0.42074.$$

(b) $X < 72$

$$z = \frac{72 - 85}{20} = -0.65$$

$$P(X < -0.65) = 0.25785$$

(c) $70 < X < 100$

$$z_1 = \frac{70 - 85}{20} = -0.75$$

$$z_2 = \frac{100 - 85}{20} = 0.75$$

$$P(-0.75 < z < 0.75) = 0.54675$$

17. $\mu = 100$

$\sigma = 15$

(a) $IQ > 140$

$$z = \frac{140 - 100}{15} = 2.6667$$

$$P(X > z) = P(X > 2.667) = 0.003827$$

(b) $120 < IQ < 140$

$$z_1 = \frac{120 - 100}{15} = 1.333$$

$$z_2 = \frac{140 - 100}{15} = 2.667.$$

$$P(+1.333 < z < 2.667) = P(2.667) - P(1.333).$$

$$= 0.9961 - 0.9087 = 0.0874$$

(c) $90 < IQ < 100$

$$z_1 = \frac{90 - 100}{15} = -0.667$$

$$z_2 = \frac{100 - 100}{15} = 0 \qquad P(-0.667) = 0.2476$$

(d) $P(X?) = 0.05$

$P = 0.95 \quad z = 1.645$

e) $P(X < ?) = .75$

$P = 0.25 \Rightarrow z = 0.674$

8. $\mu = 150$

$\sigma = 5$

a) $X < 145$

$$z = \frac{X-\mu}{\sigma} = \frac{145-150}{5} = -1$$

$$P(X < -1) = 0.15866$$

b) $X > 157$

$$z = \frac{X-\mu}{\sigma} = \frac{157-150}{5} = 1.4$$

$$P(X > 1.4) = 0.08076$$

c) $P(X < z) = 0.8 \Rightarrow z = +0.842$

$$z = \frac{X-\mu}{\sigma} \qquad X = \mu + z\sigma$$

$$X = 150 + 0.842 \times 5$$

$$X = 154.21$$

(d) $P(X < z) = 0.9 \Rightarrow z = 1.282$

$$X = \mu + z\sigma = 150 + 1.282 \times 5 = 156.41$$

19 Based on actual exam $\bar{X} = \frac{522}{15} = 34.8$

actual Average performance is 0.2 pts lower than the mean performance

Based on perceived exam score

$$\bar{X} = \frac{553}{15} = 36.8667$$

perceived average exam score is 1.8667 pts higher than the mean performance.