# Lab #6: Measures of Relative Standing Key

**1)**

**a 1.**

| | |
|---|---|
| PR | ? |
| est | 58-65 |
| X | 36 |
| L | 35.5 |
| $n_b$ | 23 |
| $n_w$ | 3 |
| i | 3 |
| N | 40 |

$$PR = \frac{n_w(X-L)+in_b}{Ni}*100$$

$$PR = \frac{3(36-35.5)+3\times 23}{40\times 3}*100$$

$$PR = \frac{3(.5)+69}{120}*100$$

$$PR = \frac{1.5+69}{120}*100 = \frac{70.5}{120}*100$$

$$PR = .5875*100 = 58.75$$

**a 2.**

| | |
|---|---|
| PR | ? |
| est | 18-30 |
| X | 24.5 |
| L | 23.5 |
| $n_b$ | 7 |
| $n_w$ | 5 |
| i | 3 |
| N | 40 |

$$PR = \frac{n_w(X-L)+in_b}{Ni}*100$$

$$PR = \frac{5(24.5-23.5)+3\times 7}{40\times 3}*100$$

$$PR = \frac{5(1)+21}{120}*100$$

$$PR = \frac{5+21}{120}*100 = \frac{26}{120}*100$$

$$PR = .2167*100 = 21.67$$

**b 1.**

| | |
|---|---|
| X | ? |
| est | 24-26 |
| P | .22 |
| L | 23.5 |
| $n_b$ | 7 |
| $n_w$ | 5 |
| i | 3 |
| N | 40 |

$$X = L + \left(\frac{P(N)-n_b}{n_w}\right)i$$

$$X = 23.5 + \left(\frac{.22(40)-7}{5}\right)3$$

$$X = 23.5 + \left(\frac{8.8-7}{5}\right)3$$

$$X = 23.5 + \left(\frac{1.8}{5}\right)3$$

$$X = 23.5 + (.36)3$$

$$X = 23.5 + 1.08 = 24.58$$

**b 2.**

| | | |
|---|---|---|
| X | ? | $X = L + \left(\frac{P(N) - n_b}{n_w}\right)i$ |
| est | 45-47 | |
| P | .84 | $X = 44.5 + \left(\frac{.84(40) - 31}{4}\right)3$ |
| L | 44.5 | |
| $n_b$ | 31 | $X = 44.5 + \left(\frac{33.6 - 31}{4}\right)3$ |
| $n_w$ | 4 | |
| i | 3 | |
| N | 40 | $X = 44.5 + \left(\frac{2.6}{4}\right)3$ |
| | | $X = 44.5 + (.65)3$ |
| | | $X = 44.5 + 1.95 = 46.45$ |

**2)**

$\bar{X}' = C_1 * \bar{X} + C_2$

Substituting the values:

$78 = C_1 * 73 + C_2$

Therefore, let:

$C_1=2$ (to fix SD) $C_2=-68$ (to fix $\bar{X}$)

Then:

$78 = 2*73 + -68$

So the constants work & now we can use them:

**X' = 2*X + -68**

Thus:

$X' = 2*82 + -68$
$= 164 + -68$
$= 96$

Since 96 > 92, you did better on the PSY110 test.

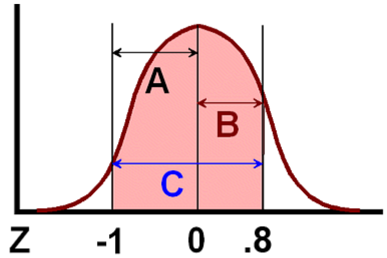
**3)**

| **Class** | **X** | $\bar{X}$ | **s** | $z = \frac{X - \bar{X}}{s}$ |
|---|---|---|---|---|
| PSY110 | 82 | 73 | 4 | $z = \frac{82 - 73}{4} = \frac{9}{4} = 2.25$ |
| PSY290 | 92 | 78 | 8 | $z = \frac{92 - 78}{8} = \frac{14}{8} = 1.75$ |

So, whether we transform one scale to another or use z scores, your Psych 110 test grade is better than the PSY290 test grade.

**4)** Kurtosis is the peakedness of a normal distribution. A normal distribution can be described as being leptokurtic (thin), mesokurtic, and platykurtic (flat). All three would give you the same mean, but the leptokurtic distribution would give the smallest standard deviation and the platykurtic distribution would give the largest.

**5) a.**



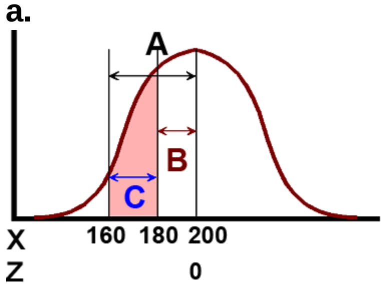

We want the area shown by C and can use the z table to determine A + B:

| | |
|---|---|
| A | .3413 |
| +B | .2881 |
| =C | .6294 |

Thus, 63% of the scores fell between a z of -1.0 and a z of 0.8.

**5) b.** Using the z table, we determine 21% of the scores fell above a z score of 0.8

**6) a.**




We need to compute z scores before we can look up relevant values in the table.

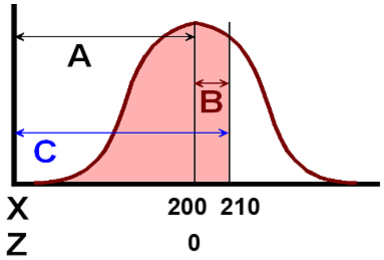
$$z_{160} = \frac{X - \bar{X}}{s} = \frac{160 - 200}{25} = \frac{-40}{25} = -1.6$$

$$z_{180} = \frac{X - \bar{X}}{s} = \frac{180 - 200}{25} = \frac{-20}{25} = -.8$$

| | |
|---|---|
| A | .4452 |
| -B | .2881 |
| =C | .1571 |

Thus, about 16% scored between a 160 and a 180 on the happiness scale. Approximately 157 people (.1571*1000) will score in that range.

**6) b.**

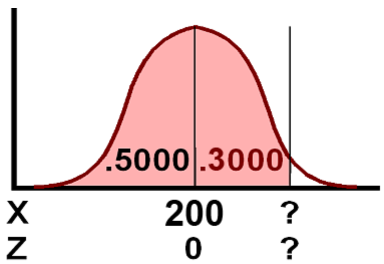



$$z_{210} = \frac{X - \overline{X}}{s} = \frac{210 - 200}{25} = \frac{10}{25} = .4$$

| | |
|---|---|
| A | .5000 |
| +B | .1554 |
| =C | .6554 |

The PR of 210 is 66. Sixty six percent of the distribution scored at or below a 210.

**6) c.**




Need to get the z score in order to determine the test score.

$$z = \frac{X - \overline{X}}{s}$$

$$.84 = \frac{X - 200}{25}$$

$$X - 200 = .84 \times 25$$

$$X = (.84 \times 25) + 200$$

$$X = 21 + 200 = 221$$

Thus, 80% of the distribution falls below a score of 221.