Pg 175

2. Z - score = 2

The results are 2 standard deviations from the mean

4. $X = 75$

$\mu = 100$

Z-score = 1.50

The difference between the score and the population mean is negative therefore the Z score should be negative.

6. $\sigma = 15$

a) $z = -1.20$ is a location that is 18 points below the mean

b) $z = +0.80$ is a point that is 12 points above the mean

c) $z = +2.00$ is a point that is 30 points above the mean

d) $z = -1.60$ is a point that is 24 points below the mean.

8. $\mu = 80$

$\sigma = 9$

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

a) $X = 83 \Rightarrow z = \frac{83 - 80}{9} = 0.333$

b) $x = 75 \Rightarrow z = \frac{75 - 80}{9} = -5/9 = -0.5556$

c) $X = 91 \Rightarrow z = \frac{91 - 80}{9} = 11/9 = 1.222$

d) $X = 67 \Rightarrow z = \frac{67 - 80}{9} = -1.4444$

e) $X = 85 \Rightarrow z = \frac{85 - 80}{9} < 0.5556$

(f) $X = 88 \Rightarrow z = \frac{88 - 80}{9} = -12/9 = -1.3333$

(b)

10. $M = 53$

$s = 11$

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

$$x = zs + m$$

a) $x = 30 \Rightarrow z = \frac{30 - 53}{11} = -2.0909$

b) $x = 39 \Rightarrow z = \frac{39 - 53}{11} = -1.2727$

c) $x = 70 \Rightarrow z = \frac{70 - 53}{11} = 1.5454$

d) $x = 48 \Rightarrow z = \frac{48 - 53}{11} = -0.4545$

e) $x = 57 \Rightarrow z = \frac{57 - 53}{11} = 0.3636$

f) $x = 64 \Rightarrow z = \frac{64 - 53}{11} = 1.000$

12. $z = 0.75$

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

(a)

a) $\mu = 90, \sigma = 4$

$x = 0.75 \times 4 + 90 = 93$

b) $\mu = 90, \sigma = 8$

$x = 0.75 \times 8 + 90 = 96$

c) $\mu = 90, \sigma = 12$

$x = 0.75 \times 12 + 90 = 99$

(d) $\mu = 90, \sigma = 20$

$x = 0.75 \times 20 + 90 = 105$

14. $X = 24$ $\quad z = +1.50$

(a) $M = 20$, $\sigma = 12$

$$z = \frac{X - M}{\sigma} = \frac{24 - 20}{12.} = 0.3333$$

$$X = z\sigma + M$$

$$= 1.5 \times 12 + 20 = 38$$

(b) $M = 20$, $s = 4$

$$z = \frac{24 - 20}{4} = 1.00$$

$$X = zs + M$$

$$= 1.5 \times 4 + 20 = 26$$

(c) $M = 30$, $s = 8$

$$z = \frac{X - M}{\sigma} = \frac{24 - 30}{8} = -0.75$$

$$X = zs + m$$

$$= 1.5 * 8 + 30 = 42$$

(d) $M = 30$ $\quad s = 10$

$$z = \frac{X - m}{\sigma} = \frac{24 - 30}{10} = -0.6$$

$$X = zs + m = 1.5 * 10 + 30 = 45$$

16. $z = 1.20$

σ

$X - m = 10$

$$z = \frac{X - m}{\sigma} \Rightarrow \sigma = \frac{X - m}{z} = \frac{10}{1.2} = 8.3333$$

18. $\sigma = 12$

$x = 115$

$z = 1.25$

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

$\mu = x - z\sigma$

$\mu = 115 - 1.25(12) = 100$

20. $s = 4$

$x = 35$

$z = -1.25$

$z = \frac{x-\mu}{s} \quad zs = x-\mu$

$\mu = x - zs$

$\mu = 35 - -1.25(4)$

$= 40$

22. $x = 56$

$z = -0.40$

$x = 70, \; z = 1.00$

$Z = \frac{x-\mu}{s} \Rightarrow x-\mu = zs$

$zs + \mu = x$

$-0.40s + \mu = 56$ (i) Solving the system of linear eqns.

$s + \mu = 70$ -(ii)

$-1.4s = -14$

$s = 10$

$s + \mu = 70$

$\mu = 70 - s = 70 - 10 = 60$

24. $x = 160$ Verbal section $M = 152, s = 7$

$x = 159$ Quantitative section $M = 149, s = 7$

Z score for verbal section $z = \frac{x-m}{s} = \frac{160-152}{7} = 1.1429$

z score for quantitative section $= \frac{159 - 149}{7} = 1.4286$

In the quantitative section the student was better because he was 10 points above the population mean and was 1.4286 standard deviations above the mean compared to the verbal section where he was only 1.1429 standard deviations above the mean.