

Groupwork PS 5.4

1. Curve 2: The larger the standard deviation the wider the graph or the wider the spread

$$2. \quad \mu = 79.3$$

$$s = 2.6$$

$$a) \quad 81.9 - 79.3 = \Delta = 2.6$$

$$\text{No. of standard deviations: } \frac{2.6}{2.6} = 1$$

$$b) \quad \Delta = 79.3 - 76.7 = 2.6$$

$$\text{No. of standard deviations} = \frac{2.6}{2.6} = 1$$

c) Z-score for 81.9 $n=2$

$$Z = \frac{X - \mu}{s/\sqrt{n}} = \frac{81.9 - 79.3}{2.6/\sqrt{2}}$$

$$= \frac{2.6}{1.838} = 1.4142$$

For 76.7

$$Z = \frac{76.7 - 79.3}{2.6/\sqrt{2}} = \frac{-2.6}{1.838} = -1.4142$$

A negative Z-score means the data is to the left ^{of the mean} in the normal distribution curve.

A positive Z-score means the data is to the right of the normal distribution curve.

$$3. \quad \bar{x} = 235.72$$

$$s = 5.31$$

$$Z = \frac{X - \mu}{s} = \frac{256.96 - 235.72}{5.31} = 4$$

$$b) z_{score} = \frac{x - \mu}{\sigma} = \frac{219.79 - 235.72}{5.31} = -3$$

$$c) z_{score} = \frac{x - \mu}{\sigma} = \frac{240 - 235.72}{5.31} = 0.80603$$

F

$$a) X = 335.30 \quad \mu = 213.1312$$

$$S = 115.082 \quad n = 781$$

$$z\text{-score} = \frac{x - \mu}{s/\sqrt{n}} = \frac{335.30 - 213.1312}{115.082/\sqrt{781}} = 29.667$$

$$b) \frac{335.30 - 213.1312}{115.082} = 1.0612$$

c) It is unusual. It has a z-score exceeding 1.96

$$d) \bar{x} = 213.1312 \text{ [from excel function on statshar}$$

$$S = 115.082$$

$$e) P(x \leq 300) = 0.7748$$

$$f) P(x > 400) = 0.9477$$

$$g) P(275 \leq x \leq 325) = 0.744 - 0.8344$$

b) $\bar{x} = 0$
 $\sigma = 1$

a) $Z\text{-score} = \frac{x - \mu}{\sigma} = \frac{1 - 0}{1} = 1$

For 2 = $\frac{2 - 0}{1} = 2$

For -1 = $\frac{-1 - 0}{1} = -1$

For $x = -3.7$ $Z\text{ score} = \frac{-3.7}{1} = -3.7$

b) They are whole numbers distributed between positive and negative side of the mean.

c) when $x = 1$ and $x = -1$, we get a perfectly normal distribution. $x = 2$ and $x = -3.7$ are unusual observations since they exceed $Z\text{-score}$ of 1.96