Math 20-2

KEY

## L38 – Worksheet – Standard Deviation

### *Part 1 – Textbook Questions*

**Pg 261 #2:** Ali bowls in a peewee league. Determine the mean and standard deviation of Ali's bowling scores, rounded to two decimal places.

Sample of Ali's bowling scores.
(Ali's played more than 12 games in his life)

| | | | |
|---|---|---|---|
| 135 | 156 | 118 | 133 |
| 141 | 127 | 124 | 139 |
| 109 | 131 | 129 | 123 |

$\bar{x} = \frac{135 + 156 + \ldots + 123}{12}$

$\bar{x} = \frac{1565}{12}$

$\bar{x} = 130.41\overline{6}$

| $x_i$ | $\bar{x}$ | $x_i - \bar{x}$ | $(x_i - \bar{x})^2$ |
|---|---|---|---|
| 135 | 130.4 | $135-130.4 = 4.6$ | $(4.6)^2 = 21.16$ |
| 156 | 130.4 | $156-130.4 = 25.6$ | $(25.6)^2 = 655.36$ |
| 118 | 130.4 | $118-130.4 = -12.4$ | $(-12.4)^2 = 153.76$ |
| 133 | 130.4 | $133-130.4 = 2.6$ | $(2.6)^2 = 6.76$ |
| 141 | 130.4 | $141-130.4 = 10.6$ | $(10.6)^2 = 112.36$ |
| 127 | 130.4 | $127-130.4 = -3.4$ | $(-3.4)^2 = 11.56$ |

| $x_i$ | $\bar{x}$ | $x_i - \bar{x}$ | $(x_i - \bar{x})^2$ |
|---|---|---|---|
| 124 | 130.4 | $124-130.4 = -6.4$ | $(-6.4)^2 = 40.96$ |
| 139 | 130.4 | $139-130.4 = 8.6$ | $(8.6)^2 = 73.96$ |
| 109 | 130.4 | $109-130.4 = -21.4$ | $(-21.4)^2 = 457.96$ |
| 131 | 130.4 | $131-130.4 = 0.6$ | $(0.6)^2 = 0.36$ |
| 129 | 130.4 | $129-130.4 = -1.4$ | $(-1.4)^2 = 1.96$ |
| 123 | 130.4 | $123-130.4 = -7.4$ | $(-7.4)^2 = 54.76$ |

$$s = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})}{n-1}} = \sqrt{\frac{21.16 + 655.36 + \ldots + 54.76}{12-1}} = \sqrt{\frac{1590.92}{11}} = \sqrt{144.629}$$

$s = 12.03$

So $\boxed{\bar{x} = 130.42,\ s = 12.03}$

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**Pg 261 #5:** Four groups of students recorded their pulse rates, as given below.

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Group A | 63 | 78 | 79 | 75 | 73 | 72 | 62 | 75 | 63 | 77 | 77 | 65 | 70 | 69 | 80 |
| Group B | 72 | 66 | 73 | 80 | 74 | 75 | 64 | 68 | 67 | 70 | 70 | 69 | 69 | 74 | 74 |
| Group C | 68 | 75 | 78 | 73 | 75 | 68 | 71 | 78 | 65 | 67 | 63 | 69 | 59 | 68 | 79 |
| Group D | 78 | 75 | 76 | 76 | 79 | 78 | 78 | 76 | 74 | 81 | 78 | 76 | 79 | 74 | 76 |

Determine the mean and standard deviation for each group, to one decimal place. Which group has the lowest mean pulse rate? Which group has the most consistent pulse rate?

Using T.I. Calculator...

| | $\bar{x}$ | s |
|---|---|---|
| Group A | $71.8\bar{6}$ | 6.22 |
| Group B | 71 | 4.12 |
| Group C | 70.4 | 5.88 |
| Group D | $76.9\bar{3}$ | 1.98 |

Group C has the lowest pulse rate.
Group D has the most consistent pulse rate.

**Pg 262 #6:** Nazra and Diko are laying patio stones. Their supervisor records how many stones they lay each hour.

| Hour | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Nazra | 34 | 41 | 40 | 38 | 38 | 45 |
| Diko | 51 | 28 | 36 | 44 | 41 | 46 |

a. Which worker lays more stones during the day?

b. Which worker is more consistent?

Using a T.I. Calculator...

Nazra

$\bar{x} = 39.\bar{3}$

$s = 3.67$

Diko

$\bar{x} = 41$

$s = 8.10$

Diko lays more stones, but Nazra is more consistent.