# TRANSFORMING RAW SCORES INTO SCALED SCORES

**Definition of Scaled Scores**:

## Adding or Subtracting a Constant

- changes the mean
- no change in variation (standard deviation)

| Original | Add Constant | New |
|---|---|---|
| 1 | + 5 | 6 |
| 2 | + 5 | 7 |
| 3 | + 5 | 8 |
| 4 | + 5 | 9 |
| 5 | + 5 | 10 |
| $\bar{X}$ = 3<br>σ = 1.581 | + 5 | $\bar{X}$ = 8<br>σ = 1.581 |

## Multiplying or Dividing by a Constant

- changes the mean
- changes the variation (standard deviation)

| Original | Multiply Constant | New |
|---|---|---|
| 1 | x 5 | 5 |
| 2 | x 5 | 10 |
| 3 | x 5 | 15 |
| 4 | x 5 | 20 |
| 5 | x 5 | 25 |
| $\bar{X}$ = 3<br>σ = 1.5811 | x 5 | $\bar{X}$ = 15<br>σ = 7.906 |

## STANDARD DISTRIBUTIONS

- Composed of scores that have been transformed (using scaling procedures) to create predetermined values for $\mu$ & $\sigma$

**Purpose of Transforming Raw Scores (X values) into Standard Scores:**

1)

2)

## *Z*-SCORE DISTRIBUTIONS

**What They Are:**

- A specific type of standardized distribution
- A distribution of raw scores that has been transformed into deviation scores
- A distribution that has a mean of zero and a std dev of 1

**Relevant Formulas:**

Determining a z-Score from a Raw Score: $z = \frac{X - \mu}{\sigma}$ or $z = \frac{X - \bar{X}}{S}$

Determining a Raw Score from a *z*-Score: $X = \mu + z\sigma$

**Example:**

For a distribution with a mean of $\mu = 60$, and a std deviation of $\sigma = 5$, what X value corresponds to a *z*-score of $z = -2.00$?

**<u>Properties of Z-Score Distributions</u>**

1) Shape

2) The Mean

3) The Standard Deviation

**Examples:**

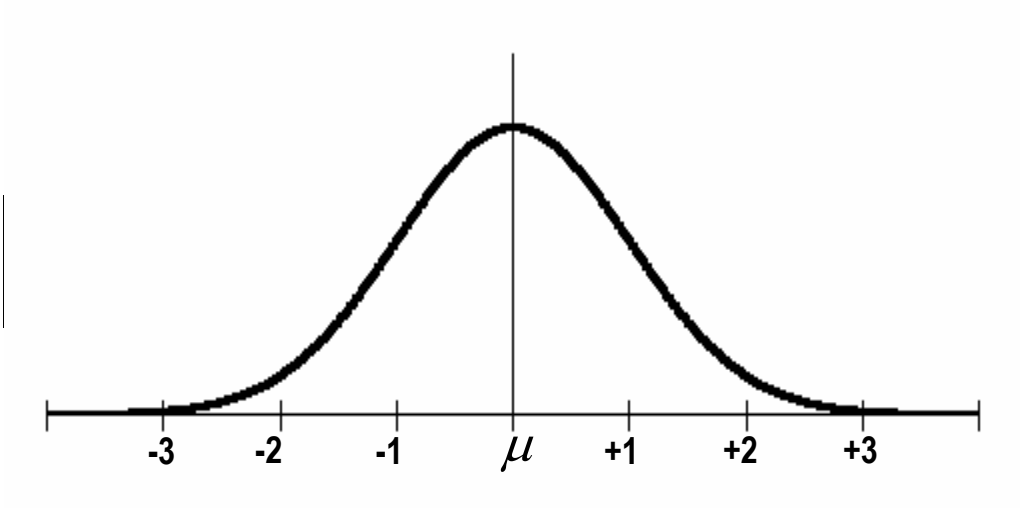
For distribution A (M = 70 & SD = 3) the score X = 76 corresponds to a *z* score of what?

For distribution B (M = 70, SD = 12), the score X = 76 corresponds to a *z* score of what?

For a distribution of standardized IQ scores with $\mu$ = 100 & $\sigma$= 15, a score of 130 would be transformed into a *z* score of what?

For a distribution of scores with $\mu$ = 80 & $\sigma$= 12, find the *z*-score value corresponding to each of the following scores:
X = 98 X = 86 X = 77 X = 75

For a distribution of scores with $\mu$ = 80 & $\sigma$= 12. Find the X value corresponding to each of the following *z*-scores:
*z* = -1.25 *z* = +2.50 *z* = -0.75 *z* = +1.00




| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Prof A** | **30** | **40** | **50** | **60** | **70** | **80** | **90** | |
| **Prof B** | **52** | **58** | **64** | **70** | **76** | **82** | **88** | |

Prof A's History Exam $\bar{X}$ = 60 *S* = 10

Prof B's History Exam $\bar{X}$ = 70 *S* = 6

Emma is in Prof A's class, & her score was 86.

Her boyfriend Tanner is in Prof B's class, & his score was 84.

Who did better on the exam?

What did you base your comparison on?

# CONCEPTUAL MAP