Ch 5.4 Normal Distributions: Finding Values

1. Sketch a normal distribution curve, enter the given probability or percentage in the appropriate region of the graph, and identify the x value(s) being sought.

2. Use Table A-2 to find the z score corresponding to the region bounded by x and the centerline of 0. **Cautions:**

- Refer to the **BODY** of Table A-2 to find the closest area, then identify the corresponding z score.

- Make the z score *negative* if it is located to the left of the centerline.

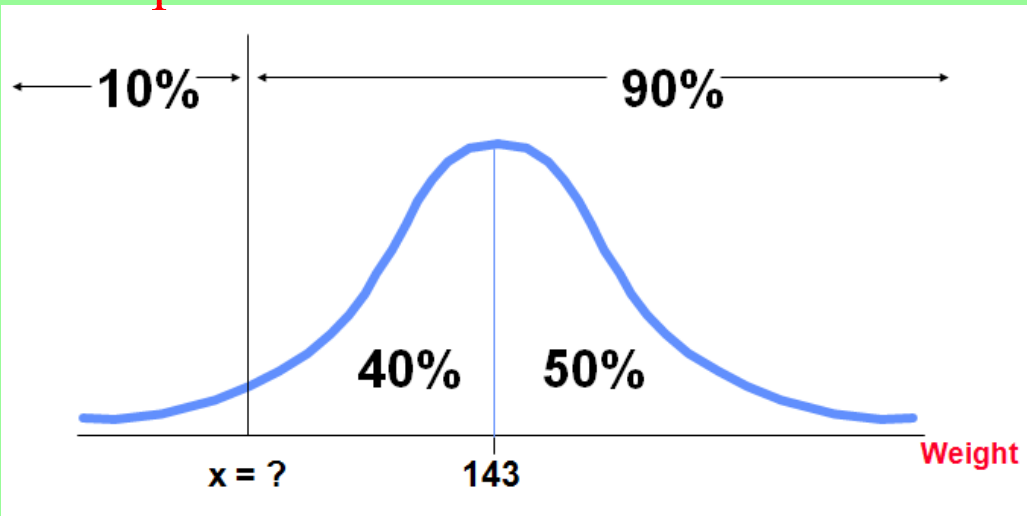
3. Using Formula 5-2, enter the values for μ, σ, and the z score found in step 2, then solve for x.

$$x = \mu + (z \cdot \sigma) \quad \text{or} \quad z = \frac{\text{score - mean}}{\text{st. dev}}$$

4. Refer to the sketch of the curve to verify that the solution makes sense in the context of the graph and the context of the problem.

Ex1. Women's weights have a mean weight of 143 lb and standard deviation of 29 lb. Find the value that separates bottom 10% from top 90%.

1. Draw a picture



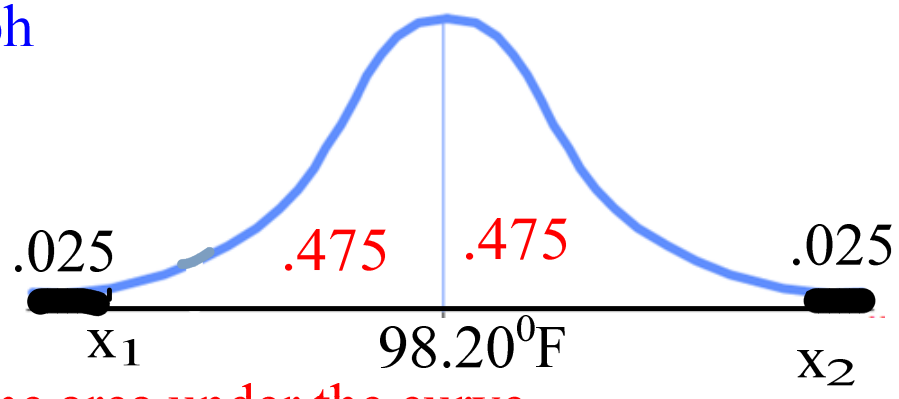
2. Find the % to look up in the body of the table.

3. Find what z-score corresponds to %. On the left, z-scores are negative!

4. Use the z-score formula to find x which is the weight for that divides bottom 10% and to 90%.

Ex2) The body temperature of a healthy adults are normally distributed with a mean of 98.20^0F and a standard deviation of 0.62^0F. If a medical researcher wants to study people in the bottom 2.5% and people in the top 2.5 %, find the temperatures separating those limits.

1. Graph



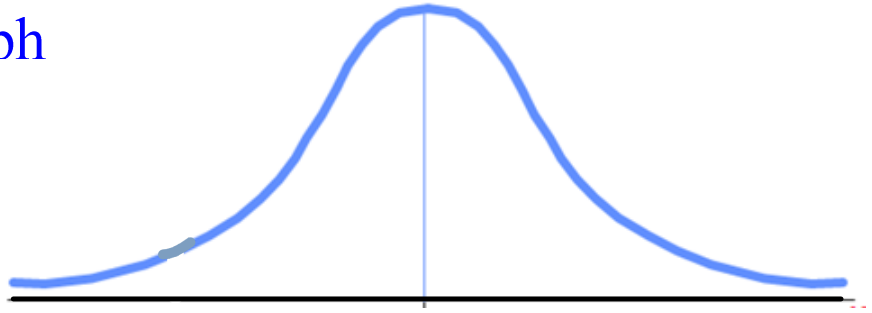
2. Find the area under the curve.

3. Find the z-scores that go with the probabilities.

4. Use the z-score to find x.

Ex3) For a medical study, a researcher wishes to select people in the middle 60% of the population based on blood pressure. If μ pressure is 120 and σ is 8, find the upper and lower readings that would qualify people to participate.

1. Graph



2. Find the area under the curve.

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4. Use the z-score to find x.

Try: An athletic association wants to sponsor a race. The average time is 58.6 minutes and $\sigma = 4.3$ minutes. If prizes are awarded to the fastest 20%, what is the cutoff time?