

Worksheet: Applying Normal Distribution

Instructions: For each problem, use the given mean and standard deviation to fit the data to a normal distribution. Then, estimate the percentage of the population that falls within the specified range. You may use normal distribution tables, calculators, or statistical software to assist with your calculations.

1. Exam Scores

- **Mean:** 78
- **Standard Deviation:** 5

Find the percentage of students who scored between 73 and 83.

2. Height of a Population

- **Mean:** 66 inches
- **Standard Deviation:** 2.5 inches

Estimate the percentage of people who are between 63 and 68 inches tall.

3. Daily Temperatures

- **Mean:** 70°F
- **Standard Deviation:** 4°F

Calculate the percentage of days with temperatures between 66°F and 74°F.

4. Light Bulb Lifespan

- **Mean:** 1,200 hours
- **Standard Deviation:** 60 hours

Determine the percentage of light bulbs that last between 1,100 and 1,300 hours.

5. Weight of Apples

- **Mean:** 150 grams
- **Standard Deviation:** 10 grams

Find the percentage of apples that weigh between 140 and 160 grams.

6. Monthly Salaries

- **Mean:** \$3,500
- **Standard Deviation:** \$300

Estimate the percentage of individuals who earn between 3,000 and 3,800 per month.

7. Reaction Time

- **Mean:** 0.75 seconds
- **Standard Deviation:** 0.1 seconds

Calculate the percentage of people with reaction times between 0.6 and 0.9 seconds.

8. Test Scores

- **Mean:** 85
- **Standard Deviation:** 7

What percentage of students scored below 92?

9. Student Heights

- **Mean:** 5 feet 6 inches (66 inches)
- **Standard Deviation:** 3 inches

Determine the percentage of students who are shorter than 63 inches.

10. Car Fuel Efficiency

- **Mean:** 25 miles per gallon (mpg)
- **Standard Deviation:** 4 mpg

Estimate the percentage of cars with fuel efficiency between 21 and 29 mpg.

Solution Hints:

1. Convert the raw scores to Z-scores using the formula:

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

2. Use the Z-scores to find the corresponding percentages from the standard normal distribution table or a calculator.
3. For ranges, find the percentage for each boundary and subtract as needed.

Feel free to distribute this worksheet to your students to practice applying the concepts of normal distribution and to check their understanding of the material.