

Types of Solutions

The type of solution that is required for a given problem may vary depending on the problem situation. For some problems, it may be necessary to find an exact answer. For other problems, an exact answer may not be needed, and a *rough estimate* or an *approximation* can be found. To find a rough estimate, round the quantities given in the problem and then find the solution of the problem. To find an approximation, round the answer of a problem to a specific place value.

Example Determine Types of Solutions

BIOLOGY Aaliyah collects and studies butterflies. She caught five butterflies with wingspans 28.3, 42.6, 63.2, 22.8, and 59.7 millimeters wide.

a. About how wide is the average wingspan?

The question is asking *about* the width of the average wingspan, so you can find the solution by using a rough estimate. First, estimate the width of the wingspan for each butterfly. Then add the estimates, and divide by the number of butterflies.

$$\begin{array}{r} 28.3 \longrightarrow 30 \text{ mm} \\ 42.6 \longrightarrow 40 \text{ mm} \\ 63.2 \longrightarrow 60 \text{ mm} \\ 22.8 \longrightarrow 20 \text{ mm} \\ 59.7 \longrightarrow + 60 \text{ mm} \\ \hline 210 \text{ mm} \end{array}$$

There are five butterflies, so the average wingspan is about $210 \div 5$ or 42 millimeters.

b. How wide is the average wingspan to the nearest millimeter?

The question is asking how wide the average wingspan is to a specific place value, so the solution will be an approximation.

$$28.3 + 42.6 + 63.2 + 22.8 + 59.7 = 216.6$$

Therefore, the average wingspan is about 217 millimeters.

Exercises

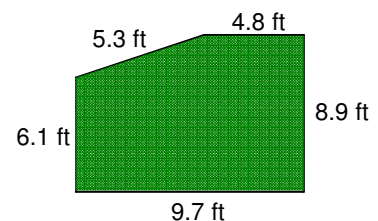
For each problem, determine whether a *rough estimate*, an *approximation*, or an *exact answer* is required. Then solve the problem, and explain your technique.

1. **METEOROLOGY** The temperature at noon for each day during one week is shown below. What was the average temperature (in degrees Fahrenheit) during that week to the nearest tenth of a degree?

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
73.5°	69.4°	71.1°	72.0°	67.3°	76.9°	75.6°

2. **ZOOS** On Friday and Saturday, a zoo had a total of 375 visitors. On Saturday, there were twice as many visitors as there were on Friday. How many people visited the zoo each day?

3. **GARDENING** A neighborhood is creating a community vegetable garden with the dimensions shown. If 40 feet of fencing are available to enclose the garden, about how much fencing will be left over?



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Answers

1. approximation; 72.3°
2. exact answer; Friday: 125, Saturday: 250
3. rough estimate; 5 ft