A Problem Solving Plan

Goal: Use a problem solving plan to solve problems.

Vocabulary

Unit analysis: Evaluate expressions with units of measure and check that your answer uses the correct units

EXAMPLE 1 Understanding and Planning

Shopping The table shows the size and cost of each container of juice. Which juice is the better buy?

	Size (fl oz)	Cost ($)
Juice A	48	3.39
Juice B	64	4.09

Solution

To decide which juice is the better buy, you need to make sure you understand the problem. Then make a plan for solving the problem.

Read and Understand

What do you know?

The table tells you the size and cost of each juice.

The size of Juice A is 48 fluid ounces, and it costs $3.39.

The size of Juice B is 64 fluid ounces, and it costs $4.09.

What do you want to find out?

Which juice is the better buy?

Make a Plan

How can you relate what you know to what you want to find out?

Find the unit cost of each juice.

Compare the unit costs.

You will solve the problem in Example 2.

1. Which formula can you use to find the unit costs of Juice A and Juice B? Explain your reasoning.

A. unit cost $= \dfrac{\text{cost of juice}}{\text{size of juice}}$ B. unit cost $= \dfrac{\text{size of juice}}{\text{cost of juice}}$

EXAMPLE 2 Solving and Looking Back

To solve the problem from Example 1, you need to carry out the plan and then check the answer.

Solve the Problem

To find the unit cost of each juice, use the formula

unit cost $= \dfrac{\boxed{\text{cost of juice}}}{\boxed{\text{size of juice}}}$.

Juice A: unit cost $= \dfrac{\boxed{\text{cost of juice}}}{\boxed{\text{size of juice}}}$ Juice B: unit cost $= \dfrac{\boxed{\text{cost of juice}}}{\boxed{\text{size of juice}}}$

$= \dfrac{\$\boxed{3.39}}{\boxed{48}\ \text{fl oz}}$ $= \dfrac{\$\boxed{4.09}}{\boxed{64}\ \text{fl oz}}$

> The ≈ symbol means *is approximately equal to.*

$\approx \$\boxed{0.07}$ per fl oz $\approx \$\boxed{0.06}$ per fl oz

Compare the unit costs to find the better buy.

$\$\boxed{0.07}$ per fl oz $> \$\boxed{0.06}$ per fl oz

Answer: $\boxed{\text{Juice B}}$ is the better buy.

Look Back

Does your answer make sense?

Notice that $\boxed{\text{Juice A}}$ has a greater unit cost than $\boxed{\text{Juice B}}$,

making $\boxed{\text{Juice A}}$ more expensive than $\boxed{\text{Juice B}}$. So it makes

sense that $\boxed{\text{Juice B}}$ is the better buy.

EXAMPLE 3 **Multiple Choice Practice**

You have two pen pals. Your pen pal from Mexico sends you 55 pesos. Your pen pal from Japan sends you 725 yen. One U.S. dollar is equivalent to 10.13 pesos. One U.S. dollar is equivalent to 122.63 yen. What is the total amount, in U.S. dollars, you receive from your pen pals?

(A) $5.88   (B) $6.36   (C) $11.34   (D) $72.02

Solution

Read and Understand You receive 55 pesos and 725 yen. One U.S. dollar is equivalent to 10.13 pesos. One U.S. dollar is equivalent to 122.63 yen. You are asked to find the total amount, in U.S. dollars, you receive from your pen pals.

Make a Plan Convert pesos to U.S. dollars and yen to U.S. dollars using unit analysis. Then add to find the total amount.

Solve the Problem Because 10.13 pesos are equivalent to one U.S. dollar, you can multiply the number of pesos you receive by

$$\frac{1 \text{ US dollar}}{10.13 \text{ pesos}}$$ to convert pesos to U.S. dollars.

$$55 \text{ pesos} \times \frac{1 \text{ US dollar}}{10.13 \text{ pesos}} \approx \$ 5.43$$

Use the unit rate for yen to convert yen to U.S. dollars.

$$725 \text{ yen} \times \frac{1 \text{ US dollar}}{122.62 \text{ yen}} \approx \$ 5.91$$

Answer: You receive $ 5.43 + $ 5.19 = $ 11.34 from your pen pals.

The correct answer is C .   (A) (B) (C) (D)

2. If your pen pals send you 75 pesos and 705 yen, is the total amount, in U.S. dollars, more or less than the total amount you received in Example 3?

A Problem Solving Plan

1. Read and | understand | the problem.

- Distinguish between relevant and irrelevant information.
- Identify missing information.
- Sequence and prioritize information.

2. Make a | plan |.

- Identify relationships.
- Observe patterns.
- Determine whether the problem can be broken into simpler parts.
- Make conjectures.
- Determine whether the answer needs to be exact or can be approximate.

3. | Solve the problem |.

- Apply strategies/results from simpler problems.
- Test/justify conjectures.
- Use estimation, then make precise calculations and give the answer to an appropriate degree of accuracy.
- Express the solution clearly; explain mathematical reasoning.

4. Look | back |.

- Check the reasonableness of the solution using estimation and the context of the problem.
- Generalize results.

Homework