1.3 Notes: Polya's Four-Step Method

Key

1. Understand the Problem:

- ✓ Read the problem **several** times.
- ✓ What is the overall idea of the problem?
- ✓ What information is given?
- ✓ What are you trying to find?

2. Devise a Plan:

- ✓ Look for a pattern.
- ✓ Make a list or a table.
- ✓ Draw a diagram of the problem
- ✓ Use trial and error.
- ✓ Use estimation to make an educated guess, then work backwards.
- ✓ Look for a "catch". There may be a trick.
- ✓ Try to express the problem more simply and solve a simpler problem.

3. Carry out the plan:

- ✓ Follow your plan
- ✓ Check each step.
- ✓ Try plan B if plan A doesn't work.

4. Look Back:

- ✓ Can you check your result?
- ✓ Did you answer the question?
- ✓ Is it reasonable?

1-2) Which necessary piece of information is missing and prevents you from solving the following problems?

1) A man purchased 5 shirts, each at the same discount price. How much did he pay for them?

Given: bought 5 shirts all cost the same

Find: Cost each shirt

Missing: Total cost of the 5 shirts

PAIRS

2) The bill for your meal totaled $20.36 including tax. How much change should you receive from the cashier?

Given: Total bill $20.36

Find: Change received

Missing: Amount of money you gave cashier

...cer Value Questions

The **unit price** of a product = $\frac{\text{Total price}}{\text{Total units}}$

Solve the following problems using the four-step method. If the problem contains information that is not relevant to its solution, identify the unnecessary piece of information.

3) A manufacturer packages its apple juice in bottles and boxes. A 128-ounce bottle costs $5.39 and a 9-pack of 6.75 ounce boxes costs $3.15. Which packaging is the better value?

Understand the Problem:

Given: 128 oz bottle costs $5.39

9 pack 6.75 oz boxes costs $3.15

Find: Better value

Devise a Plan:

Need unit price: bottle $\frac{\$\ 5.39}{128\text{ oz}}$ boxes $\frac{\$3.15}{9(6.75)\text{oz}}$

* Compare

Carry out the Plan:

bottle unit price: $\$.042/\text{oz} \approx \$.04/\text{oz}$ box $\$.054/\text{oz} \approx \$.05/\text{oz}$

Bottles are better value at $.04/oz.

Look Back:

Check answers: bottle $\$.042/\text{oz} \cdot 128\text{oz} = \$5.38$ box $\frac{\$.05}{\text{oz}} \cdot 9(6.75)\text{oz} = \$3.16$

4) What is the better value: A 16-ounce bottle of Coca-Cola for $0.75 or a 20-ounce bottle for $1.00?

PAIRS

16 oz at $0.047/oz

5) By paying $350 cash up front and the balance at $45 per month, how long will it take to pay for a computer costing $980?

14 months

6) A business has 13,065 packages to send by ground shipping. Each weigh 14 lbs., but a truck can only hold 14,650 lbs. How many trucks will be needed to ship all of the packages?

otes

Understand: Given

16-oz bottle $0.75

20-oz bottle $1.00

Find Better Value

Plan: Find unit price and compare

$\frac{\$.75}{16\text{ oz}} = .0469$ $\qquad$ $\frac{\$1.00}{20\text{ oz}} = \$.05/\text{oz}$

Carry Out: $\approx .047\ \$/\text{oz}$

The 16oz bottle is a better deal at $\$.047/\text{oz}$

✓ Check: $16 \times .047 = .752$

✓ $20 \times .05 = \$1.00$

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5) Understand: Given

Pay $350 up front

$45/month

total $980

Find

months to pay off

Plan:

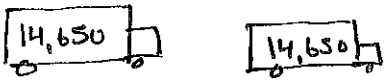
$980 - 350 = \$630$ to be paid monthly

Carry Out:

$\frac{\$630}{\$45/\text{month}} =$ 14 months to pay off

Check: $350 + 14(45) = \$980$ ✓

6) Understand Given 13,065 packages



Each 14 lbs

truck hold 14,650 lbs

Find # trucks to hold all packages

Plan Find total weight all packages 13,065 * 14 lb

Divide total by 14,650 (how much each truck holds)

to find # trucks needed

Carry Out Plan $13065 \cdot 14 = 182,910$ lb

$$\frac{182,910}{14,650} = 12.485$$

13 trucks are needed.