

1A Handshake Problem.doc

Prealgebra

Name: _____

Due Date: _____

WHY: In addition to reviewing procedures for calculation in this class, you will improve your transferable skills of problem solving and communication.

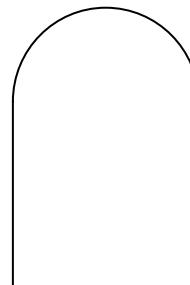
LEARNING OBJECTIVES:

- 1) Develop a problem-solving method.
- 2) Clearly communicate your problem-solving thought process

WARM-UP:

Below are an example problem and two example solutions.

- 1) **Problem:** As part of a crafts project, Susan is making a miniature window frame by bending a pipecleaner. The window is shaped like a square with half of a circle on top (see diagram). If the pipecleaner is 30 cm long how long should the bottom of the window frame be? Round to the nearest tenth of a centimeter.
Hints: the circumference of a circle is $C = \pi d$, and π is approximately 3.14.



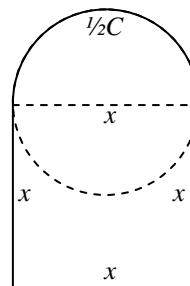
Solution #1:

$$\begin{aligned} 30 &= 3x + \frac{1}{2} C \\ 30 &= 3x + \frac{1}{2} \pi x \\ 30 &\approx 4.57x \\ x &\approx \mathbf{6.6} \end{aligned}$$

Solution #2:

Let x = length of a side of the square
The diameter of the circle is also x
The perimeter of the window is three sides of the square (left, bottom, and right, plus the top half of the circumference of the circle.
Perimeter = three sides of the square + $\frac{1}{2}$ of the circumference

$$\begin{aligned} 30 &= 3x + \frac{1}{2} C \\ 30 &= 3x + \frac{1}{2} \pi x && \text{because } C = \pi x \\ 30 &\approx 3x + \frac{1}{2} (3.14) x \\ \frac{30}{4.57} &\approx \frac{4.57x}{4.57} && \text{combine like terms} \\ x &\approx \mathbf{6.6 \text{ cm}} && \text{divide both sides by 4.57} \end{aligned}$$



Check: $3(6.6) + \pi(6.6)/2 \approx 30.16$, which is close to 30 ☺

The length of the bottom of the window frame should be approximately 6.6 cm.

Which solution does a better job of communicating the problem solver's thought process?
Give three specific reasons for your answer.

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ACTIVITY:

Solve the problem on below. Clearly communicate your problem-solving thought process. You may work with others in your group, but you need to write up your own solutions on your own paper.

“Forty-five people attend a party. If every person shook the hand of everyone else just once, how many handshakes were there altogether?”

List the steps of a general problem-solving method, and fill in some details underneath each step.

a) _____

b) _____

c) _____