

STUDENT MANUAL

MARICOPA CENTER FOR LEARNING AND INSTRUCTION

UBUYACAR

PROBLEM-BASED LEARNING MANUAL

PROBLEM STATEMENT

You are interested in purchasing a new vehicle. What should your annual salary be to afford the car you want?

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Maricopa Center for Learning and Instruction
(part of the Maricopa Community Colleges)
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GateWay Community College
- **Dr. Irwin Noyes**
Scottsdale Community College

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A NOTE TO THE STUDENT

At first glance, the problem statement on the previous page might look like many of the word problems you have worked this semester. Upon closer inspection, however, you should notice that is probably unlike any problem you have been exposed to before. There are no numbers, not much information, and what you are asked to find might not be crystal clear! This is an example of a real-world problem, and it is one that most of us will face sooner or later. So, it is a real-world-real-to-us kind of problem!

So, what do you do? How do you start? How do you know when you are through? These are all questions to which you must find the answers (with guidance from your instructor). It will be helpful for you to review the problem solving process contained in this packet. That will give you a place to start.

You will have many questions on your way to a solution. Some of these your instructor will answer, and some of these you must answer for yourself. This problem will allow you to demonstrate your problem-solving and critical thinking skills, as well as your skills in arithmetic.

So, good luck, and have fun!

Donna Tannehill and Yvonne Zeka
Maricopa Community Colleges
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PROBLEM SOLVING PROCESS

1. Understand the problem

Identify the problem — unknown
What are you asked to find/solve?

Known

Define terms
Assumptions
Other previous knowledge
Relevant / irrelevant information

Unknown

Gather further information

2. Devise a plan

Sketch a picture or a diagram
Determine operations
Take a risk — Behold the turtle for he does not move
forward without sticking out his neck.

3. Carry out the plan

Write out steps
Perform operations

4. Evaluate

Is the problem solved?
Is it reasonable?

HOW DO PEOPLE SOLVE PROBLEMS?

This is how Mary O'Meara, creative director at Young & Rubicam in the sixties, answered that question from a high school student.

There is the *sponge* part: when you soak up all the information you can discover (and a lot of misinformation).

There is the *shake* part: when you shake out the facts and question the problem itself and start to imagine all sorts of things.

There is the *squeeze* part: when you wring out the sponge and scribble down the most promising splashes and dribbles.

There is the *bounce* part: when you and another concerned with the problem toss embryonic ideas back and forth until only the fittest survive.

There is the *scratch* part: like the above, but now you scratch brain against brain hoping to spark a new notion.

There is the *once-again-please* part: when you examine the survivors in the cold light of reason, abandon most, and incubate a few in the warm darkness of imagination.

There is the *dry* part: when you quit thinking about the damned problem and turn your mind to pleasure or routine. (You only think you've stopped thinking.)

There is the *yahoo* part: when things connect and an idea pops into your head that turns out to be the key to the solution. Often this happens when you least expect it and aren't even thinking about the big problem.

There is the *do* part: when you use your particular talents and learned skills and those of others concerned to shape and form the raw idea into a proper solution.

Then there is the *itch* part: which maybe should come first instead of last. The drive to solve problems creatively -- with a new and original solution -- stems from some chronic itch; dissatisfaction with all existing solutions. Even when the latest may be your own.

ASSESSMENT CHECKLIST

Your completed project will be evaluated on:

- Use of the problem solving process
- Justification of the decisions (mathematical support)
- Application and documentation of arithmetic from the course
- Accurate and relevant computations
- Accurate and relevant information
- Organization of project

You will be evaluated separately on your teamwork skills.

Your finished product should reflect the time and effort you have given to this project.

WHAT IT MEANS TO “AFFORD” A CAR . . .

It may seem simple at first to answer this question. However, “having enough money” and “affording” a vehicle can be two different things. Lending institutions have a definition of “afford” that is based on something called “debt-to-income ratio.” The formula for this ratio is:

DEBT TO INCOME \leq 28% OF YOUR INCOME
(this % varies, but is acceptable for this assignment)

INCOME = GROSS ANNUAL INCOME
(i.e. before taxes)

DEBT = REVOLVING CHARGES AND LOANS

So, to verify that you can afford the car you want, you must show that your debt-to-income ratio is at an acceptable level.

RESOURCES

WORLD WIDE WEB (WWW)

<http://www.webfoot.com/cgi-bin/loan.pl>
loan payment calculator

<http://edmunds.com>
pricing reports; reviews; safety information;
buying and leasing information

<http://www.kbb.com>
new-vehicle pricing reports; information on other
blue book publications

<http://www.dwx.com:8181/~iabanker/car.html>

PERIODICALS

Car and Driver (<http://www.caranddriver.com/>)
Consumer Reports
Motor Trend (<http://www.motortrend.com/>)
Road and Track

BOOKS

Pre-Algebra by Wright (your text book)

PAMPHLETS

Everybody's Money (Desert Schools Credit Union)

OTHER

NOTES / STRATEGIES

USE OF MATHEMATICS

This page is for you to record all of the different types of mathematics that you use in solving your problem. Any time you use a new operation, list it here (i.e. addition, subtraction, etc.)