Mat 1160
WEEK 3

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Spring 2010

Chapter 1: Problem Solving

- **Inductive / Deductive** Reasoning
- **Numeric Sequences**, patterns, special formulas
- **Strategies** for Problem Solving
- **Estimation** and **Graphs**

When trying to solve a problem, remember to ask yourself:

1. *What is known or given?*
2. *What am I trying to find?*
3. *What might be a good strategy?*

Read each problem carefully!

[2] **Vertical Symmetry in States' Names**

If a vertical line is drawn through the center of a figure and the left and right sides are reflections of each other across this line, the figure is said to have vertical symmetry.

When spelled with all capital letters, each letter in `HAWAII` has vertical symmetry. Find the name of a state whose letters all have vertical symmetry.

[6] **Age of the Bus Driver**

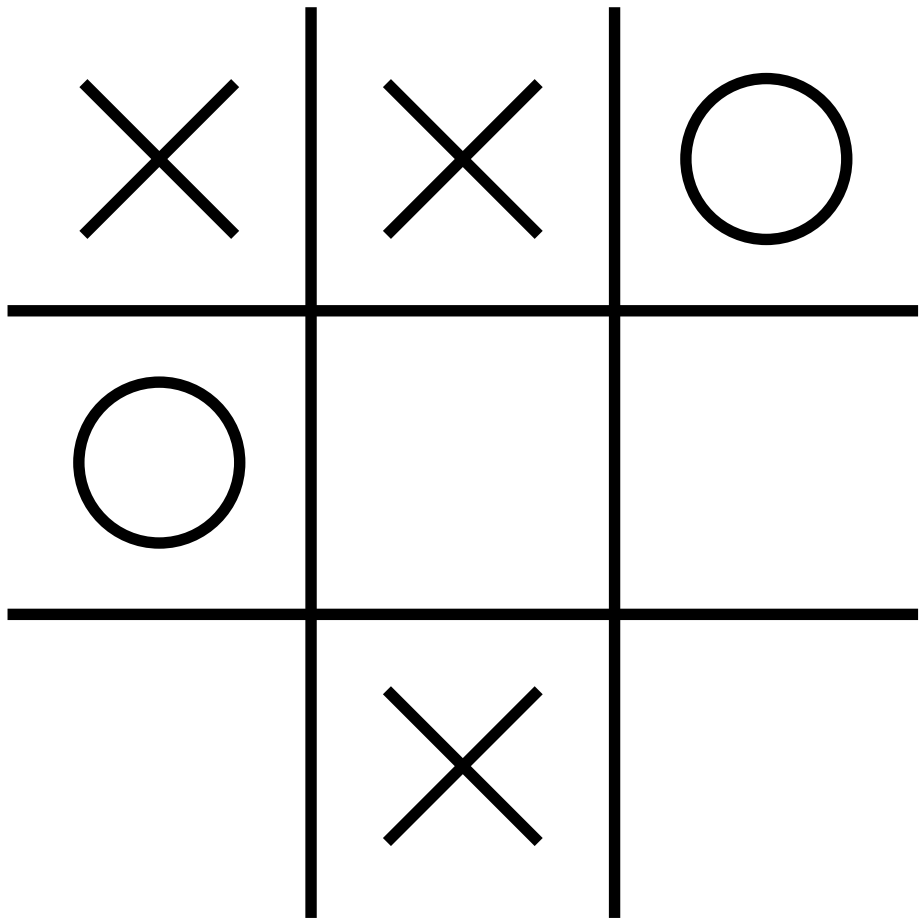
Today is your first day driving a city bus. When you leave downtown, you have twenty–three passengers. At the first stop, three people exit and five people get on the bus. At the second stop, eleven people exit and eight people get on the bus. At the third stop, five people exit and ten people get on. How old is the bus driver?

Mr. Green's Age

[4] At his birthday party (in 1997), Mr. Green would not directly tell how old he was. He said, "If you add the year of my birth to this year (1997), subtract the year of my tenth birthday and the year of my fiftieth birthday, and then add my present age, the result is eighty." How old is Mr. Green?

Tick–Tack–Don't

[8] You and a friend are playing ticktackdon't, where three in a row **loses**. You are O. If you want to win, what must your next move be?



How Old?

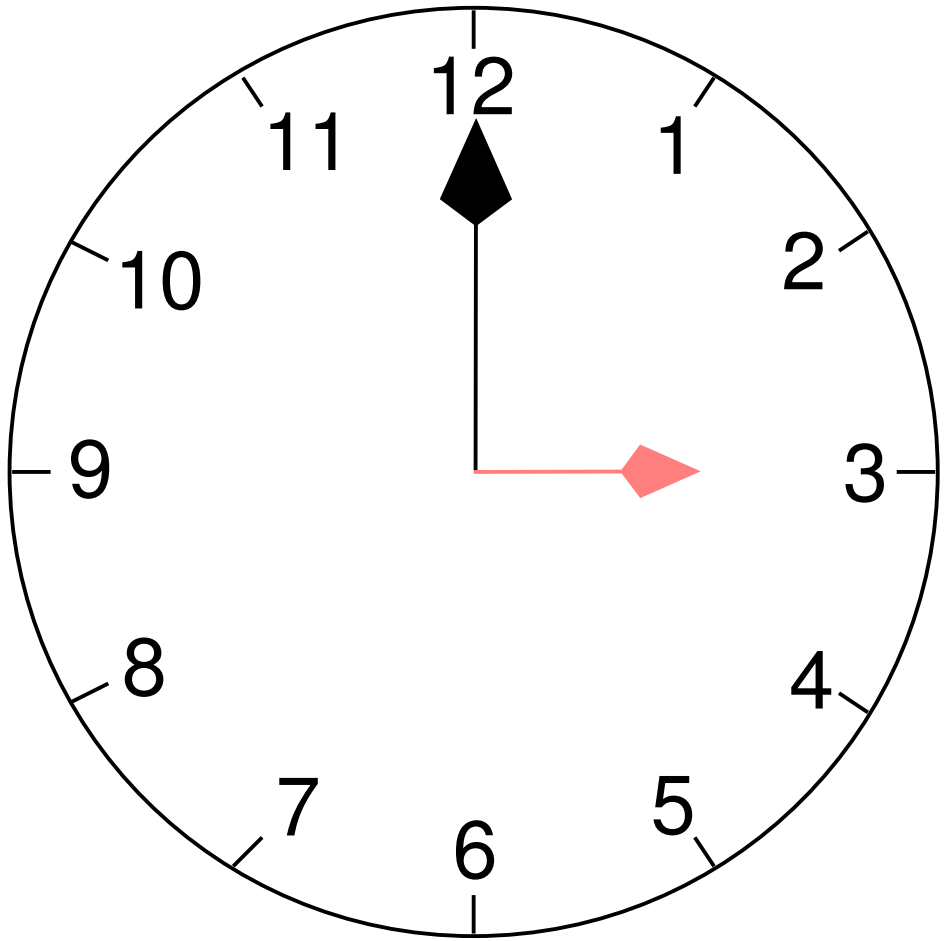
[10] Pat and Chris have the same birthday. Pat is twice as old as Chris was when Pat was as old as Chris is now. If Pat is now 24 years old, how old is Chris?

	Current Age	Past Age	Elapsed # Years
Pat			
Chris			

(Let x = Chris' current age)

Clock Face

[12] By drawing two straight lines, divide the face of a clock into three regions such that the numbers in the regions have the same total.



Perfect Square

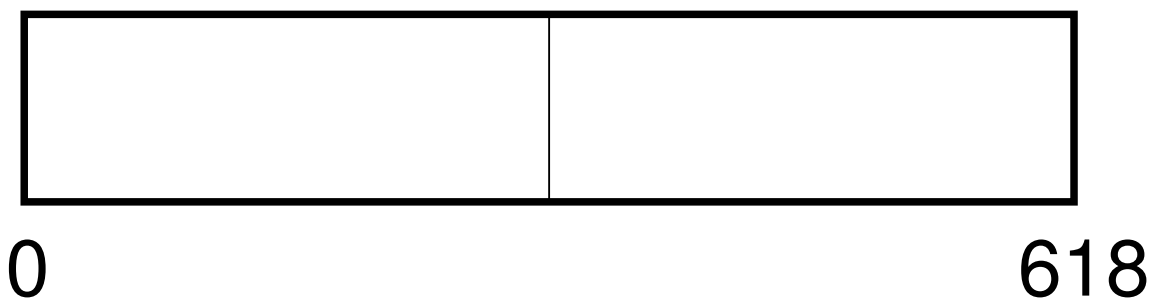
[14] Only one of these numbers is a perfect square.
Which one is it?

329476 389372 964328

326047 724203

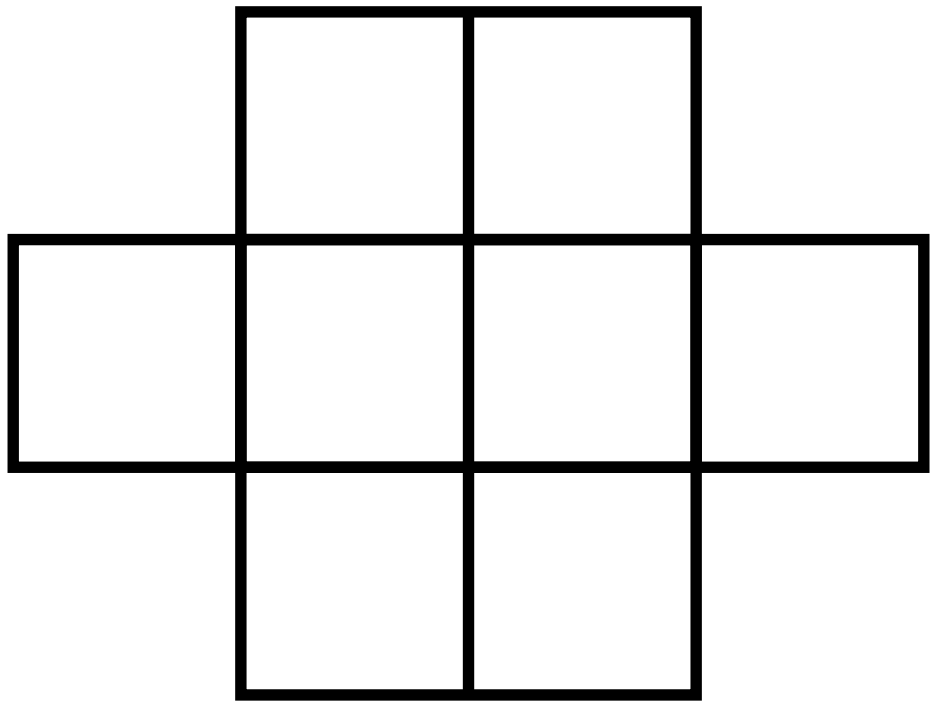
George's Turn to Drive

[15] While George and some of his friends are driving to a beach 618 miles away, George fell asleep halfway through the road trip. When he awoke, he had to take his turn and drive the remainder of the journey — half the distance they had traveled while he was sleeping. How far did George drive?



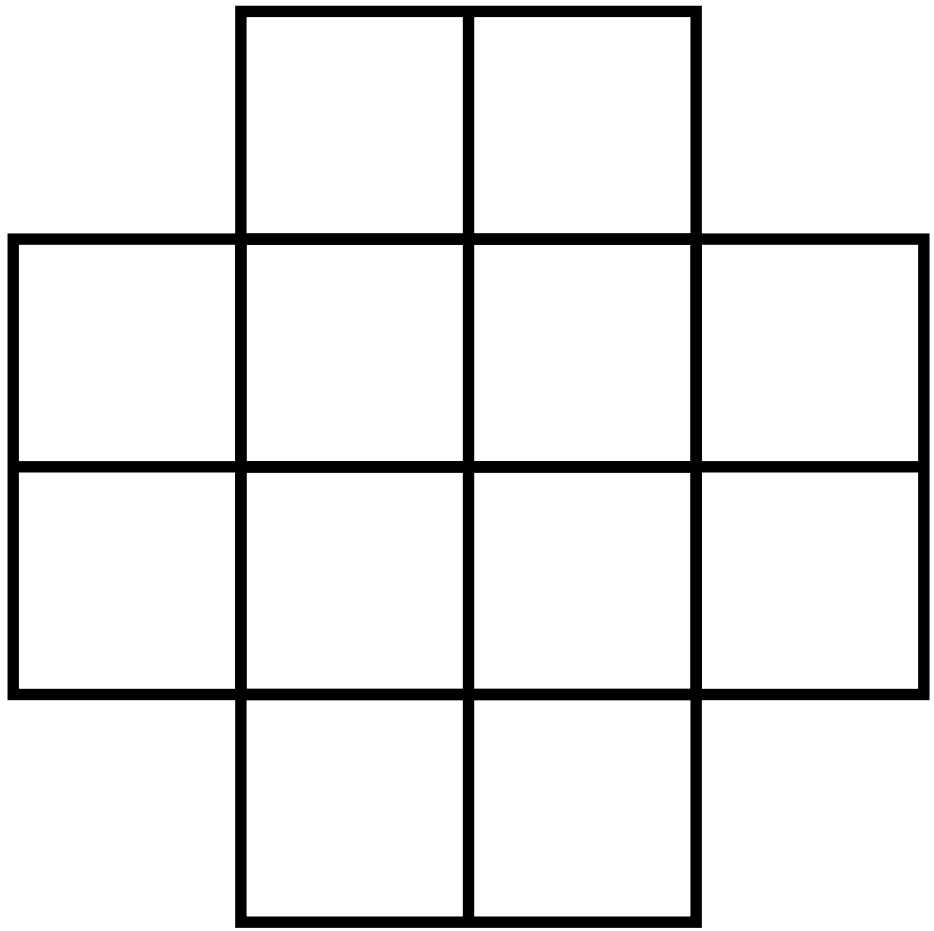
Counting Puzzle I

How many squares of any size are in the figure shown?



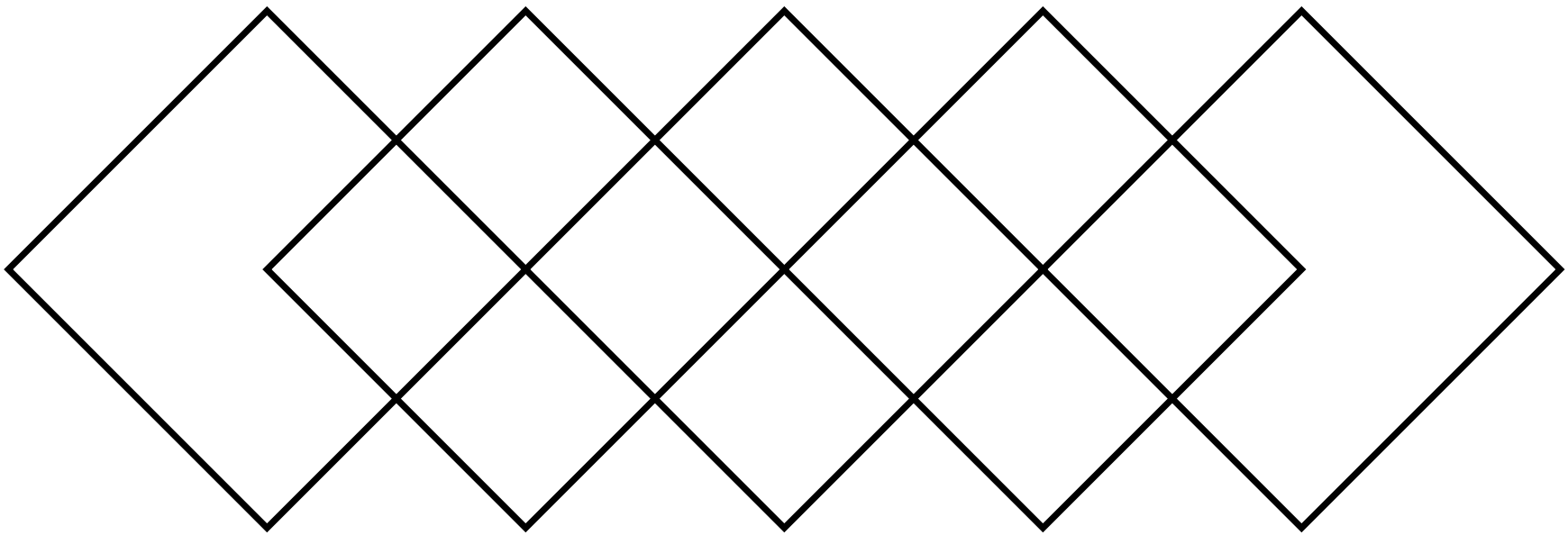
Counting Puzzle II

How many squares of any size are in the figure shown?



Counting Puzzle III

[16] How many rectangles of any size are in the figure shown?



Last Digits in Powers

[27] What is the units digit in 7^{491}?

[23] What are the final two digits of 7^{1997}?

[26] What is the units digit of 3^{324}?

Out on the Town

[28] Alison bought a book for $10 and then spent half her remaining money on a train ticket. She then bought lunch for $4 and spent half her remaining money at a thrift store. She left the store with $8. With how much money did she start?

Dang Socks Again

[31] A drawer contains 20 black socks and 20 white socks, all loose. If the light is off and you reach into the drawer to get your socks, what is the minimum number of socks you must pull out in order to be sure that you have a matching pair?

Naming Children

[36] Becky's mother has three daughters. She named her first daughter Penny and her second daughter Candy. What did she name her third daughter?

Leapin' Lily Pads!

[37] A lily pad grows so that each day it doubles its size. On the twentieth day of its life, it completely covers a pond. On what day was the pond half covered?

Alphabetic Number Name

[50] What is the least natural number whose written name in the English language has its letters in alphabetical order?

Relative Heights

[42] Donna is taller than David but shorter than Bill. Dan is shorter than Bob. What is the first letter in the name of the tallest person?

Weighing Coins

[52] We have eight coins. Seven are genuine and one is a fake, which weighs a little less than the other seven. You have a balance scale, which you may only use three times. How do we go about locating the bad coin in three weighings?

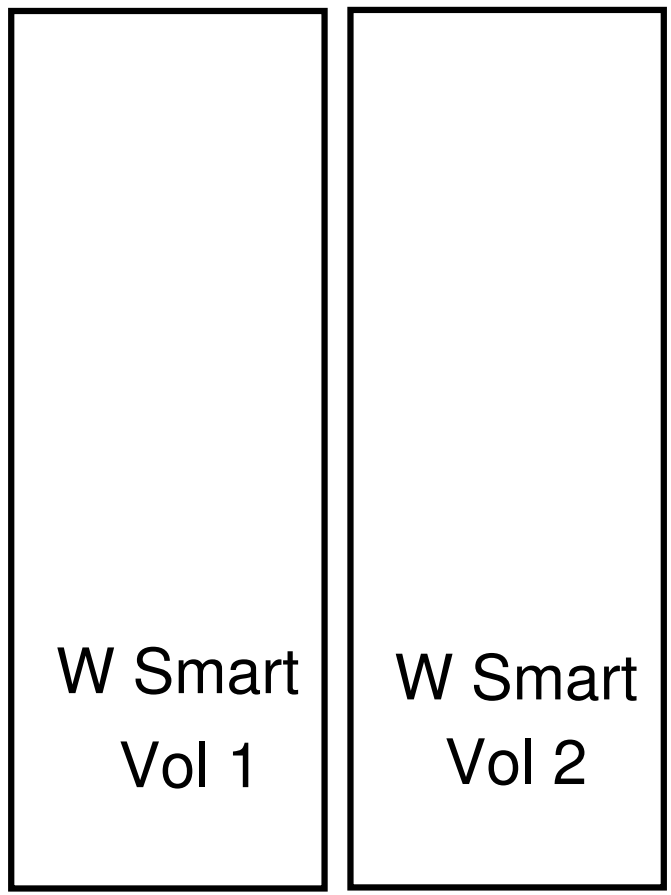
Can we find the bad coin in only two weighings?

Truth Teller & Liars

[54] Three people, Thompson, Johnson, and Anderson, are sitting side-by-side at a meeting. Thompson always tells the truth, Johnson sometimes tells the truth, and Anderson never tells the truth. The person on the left says, "Thompson is in the middle." The person in the middle says, "I'm Johnson," While the person on the right says, "Anderson is in the middle." What are the correct positions of these people?

Books on a Shelf

[62] Volumes 1 and 2 of *The Complete Works of Wally Smart* are standing in numerical order from left to right on your bookshelf. Volume 1 has 450 pages and Volume 2 has 475 pages. Excluding the covers, how many pages are between page 1 of Volume 1 and page 475 of Volume 2?



67 Some months have 30 days and some have 31 days. How many months have 28 days?

69 How much dirt is there in a cubical hole in the ground, 6 feet on each side?

64 A teenager's age increased by 2 gives a perfect square. her age decreased by 10 gives the square root of that perfect square. She is 5 years older than her brother. How old is her brother?

Trip to the Hardware Store

[58] At a hardware store, I can buy 1 for \$0.75, and I can buy 68356 for \$3.75. What am I buying?