

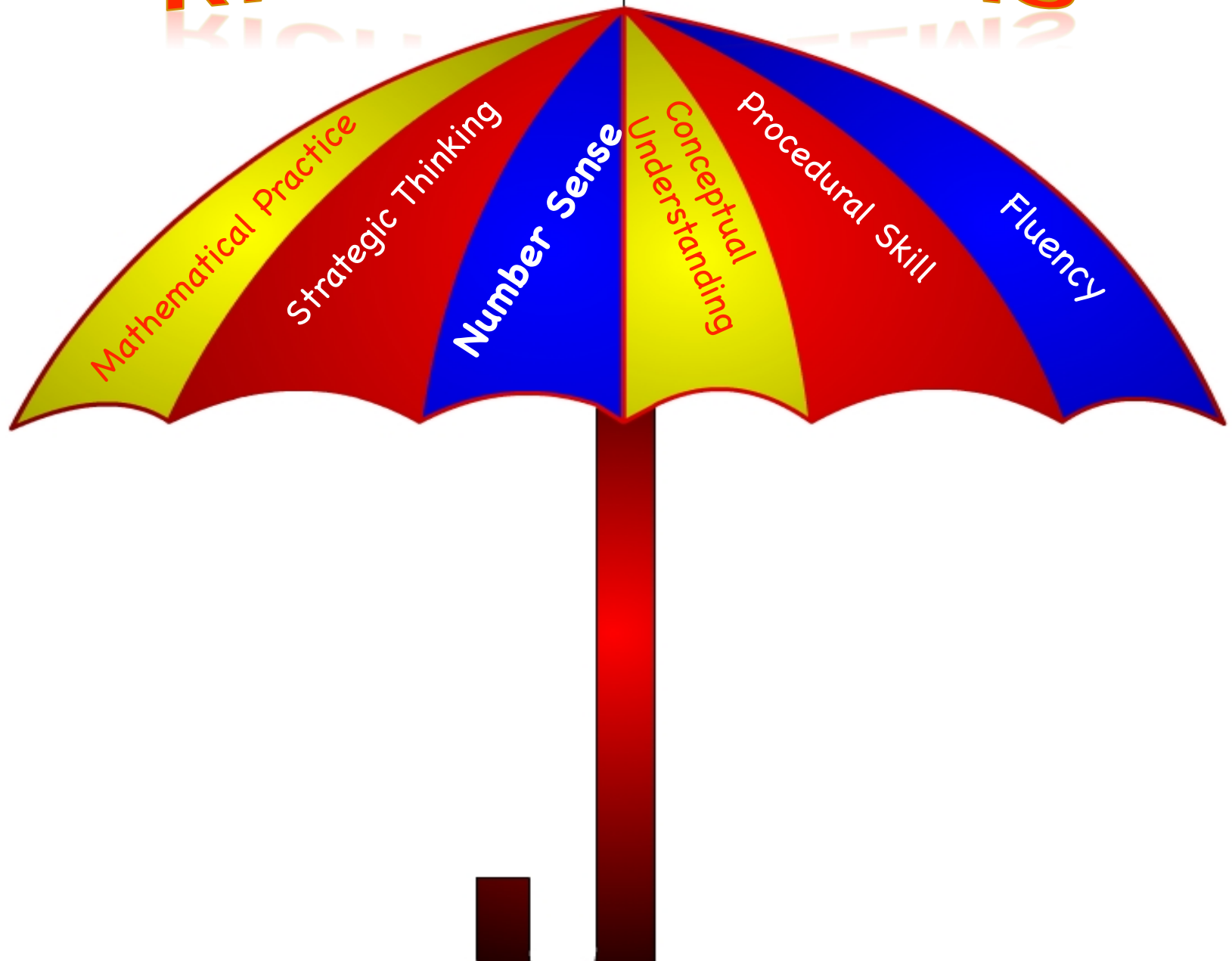


It's Raining Rich Problems!

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RICH PROBLEMS



Show and Tell Addition

$$\begin{array}{r} 332 \\ + 426 \\ \hline \end{array}$$

$$\begin{array}{r} 746 \\ + 859 \\ \hline \end{array}$$

a.
$$\begin{array}{r} 79 \\ + 16 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 27 \\ + 34 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 45 \\ + 95 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 56 \\ + 63 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 34 \\ + 44 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 12 \\ + 85 \\ \hline \end{array}$$

g.
$$\begin{array}{r} 46 \\ + 39 \\ \hline \end{array}$$

h.
$$\begin{array}{r} 56 \\ + 29 \\ \hline \end{array}$$

i.
$$\begin{array}{r} 50 \\ + 38 \\ \hline \end{array}$$

j.
$$\begin{array}{r} 58 \\ + 91 \\ \hline \end{array}$$

k.
$$\begin{array}{r} 73 \\ + 17 \\ \hline \end{array}$$

l.
$$\begin{array}{r} 94 \\ + 20 \\ \hline \end{array}$$

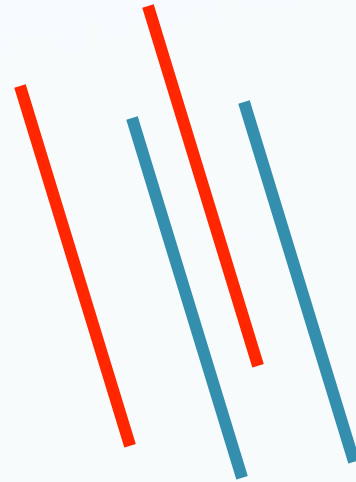
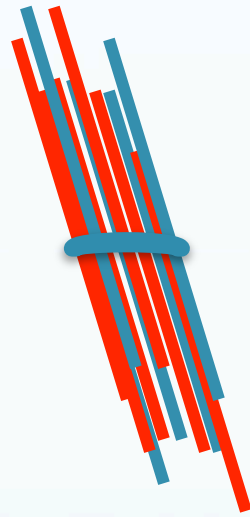
m.
$$\begin{array}{r} 22 \\ + 17 \\ \hline \end{array}$$

n.
$$\begin{array}{r} 22 \\ + 67 \\ \hline \end{array}$$

o.
$$\begin{array}{r} 73 \\ + 26 \\ \hline \end{array}$$

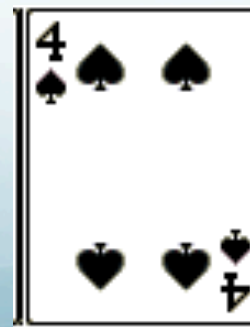
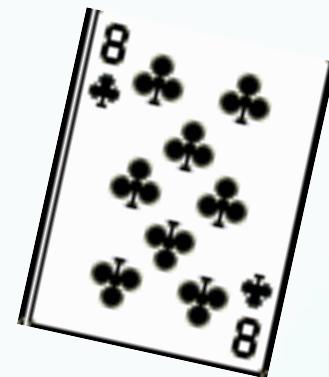
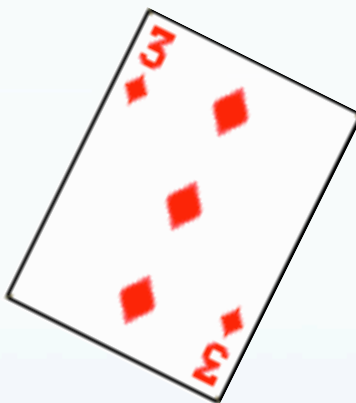
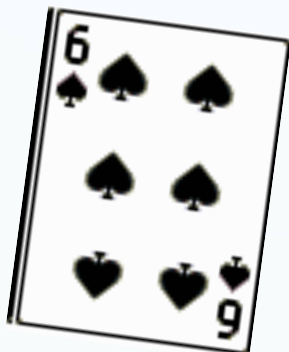
Tens

Ones

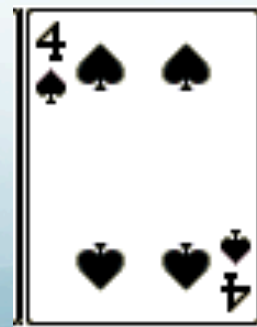
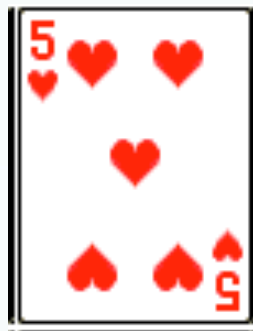
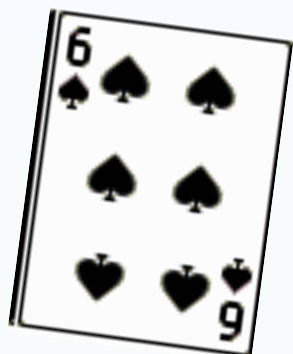


Close to 1000

Choose 6 of these cards to make an equation with two 3-digit addends and a sum that is close to 1000. How close can you get?



Choose 4 of these cards to make 2 fractions
That when added will give a sum that is
close to 1.



8 CSSM Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Rich Mathematical Task

- a situation in which an appropriate path to a solution is not readily apparent.
- can be adapted to maintain high cognitive demand while meeting the individual needs of students
- requires students to do more than remember a fact or reproduce a skill
- encourages investigations and the opportunity to think more deeply, and discuss ideas and theories with classmates.
- has multiple entry points, solution paths and, at times multiple solutions.

Rich Tasks Provide Opportunities for Formative Assessment

Students learn by solving the problem, and the teacher learns about each student from the attempt.

Using rich problems or tasks, helps teachers become aware of the depth of a student's understanding of a concept.

Questioning Students

Effective questioning, can lead to the development of mathematical thinking by keeping the focus of the questioning away from answers and procedures and on observations and uses of patterns, comparisons of different strategies, and representations, and connections among mathematical ideas.

Create a House Number



My house number has three digits.

The product of the three digits is 24.

The three digits need not be different but they might be.

What could my house number be?

List all the possible solutions.

Do you think you found all the solutions?

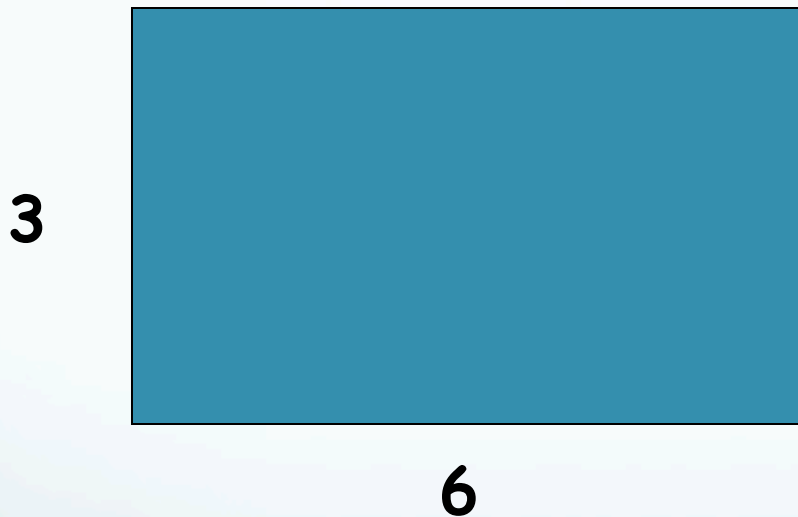
Explain how you know.

- What are some strategies you used to find the answer?
- What was the first answer you found?
- How did you know there might be additional solutions?
- How do you know if you found all of the possible solutions?
- *What Practices did you use to solve the problem?*
- *What mathematical concepts were explored in this problem?*



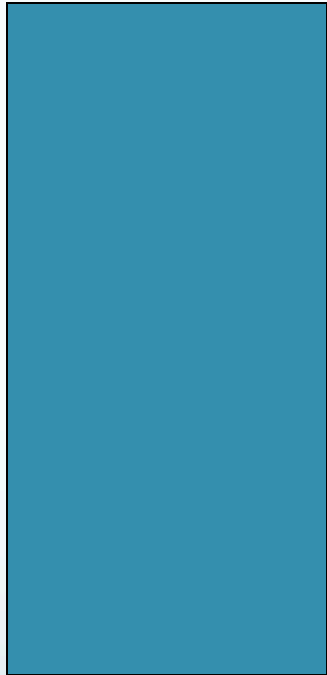
A “traditional” problem”

Find the area of this rectangle.

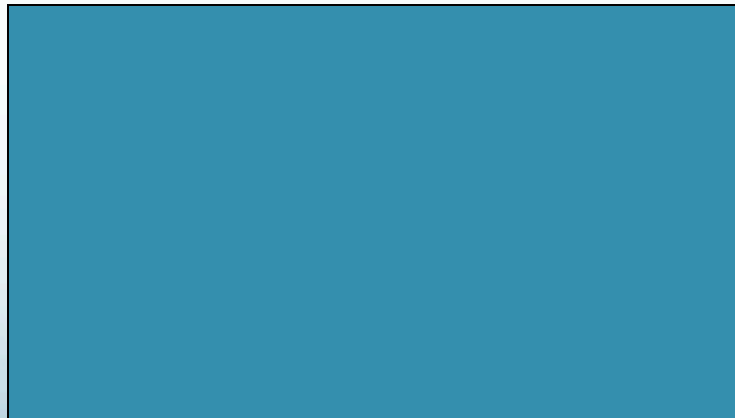
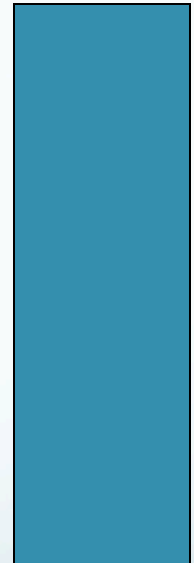


What misconceptions about area might students have with this task?

A richer task



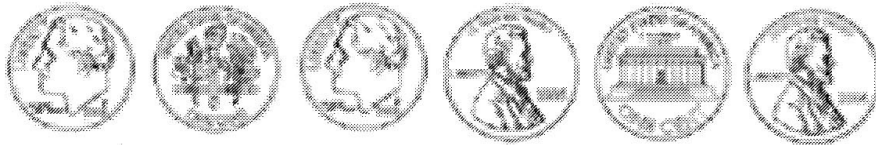
A rectangle has a perimeter of 18 units. What might its area be?



How could you redesign this example to make it a rich mathematical task?

Fill in the for the correct answer. NH means Not Here.

5. What is the value of the coins?



23¢



43¢



18¢



NH

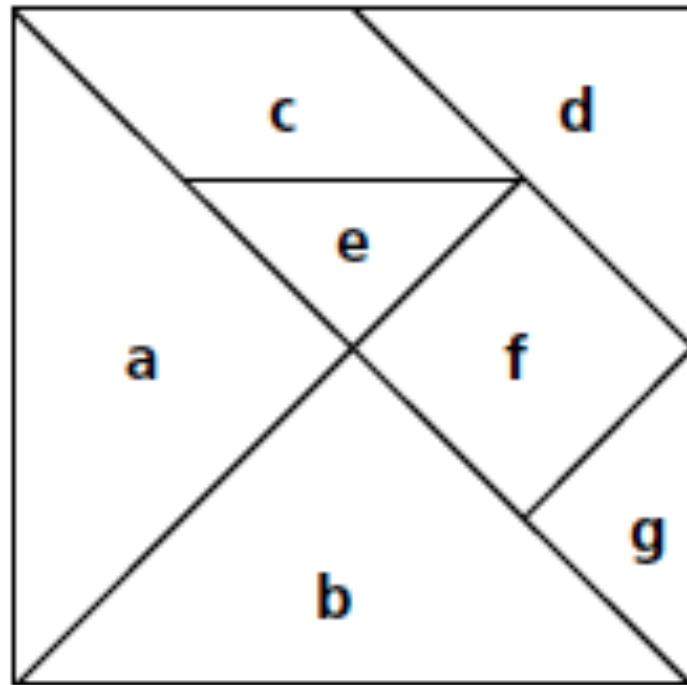


Using a strategy based approach

- LOOK FOR A PATTERN
- CONSTRUCT A TABLE
- ACCOUNT FOR ALL POSSIBILITIES
- ACT IT OUT
- MAKE A MODEL
- WORK BACKWARDS
- GUESS AND CHECK
- MAKE A DRAWING
- MAKE A GRAPH
- SELECT APPROPRIATE NOTATION
- RESTATE THE PROBLEM
- IDENTIFY WANTED, NEEDED, GIVEN INFORMATION
- IDENTIFY A SUBGOAL
- SOLVE A SIMPLER PROBLEM
- CHANGE YOUR POINT OF VIEW

In this tangram puzzle, you can make many different shapes by putting the seven pieces together in different ways.

If the area of the entire puzzle is one square unit, find the area of each of the pieces.



- ***What mathematical concepts were explored in this problem?***
- ***What Practices did you use to solve the problem?***

Let's Make a Deal

For recess time, our class would like one minute on the first day of school, two minutes on the second day, four minutes on the third day, eight minutes on the fourth day, and so on. If our teacher accepts the plan, how long will recess be at the end of the second week of school? Express your answer in more than one way.



- ***What mathematical concepts were explored in this problem?***

- ***What Practices did you use to solve the problem?***

Problem solving develops the belief in students that they are capable of doing mathematics and the mathematics makes sense.

John Vandewalle