

Building Mathematical Character



MAKE SENSE of PROBLEMS



Picture the situation.

Have I solved a problem like this before?



Look for clue words.

What is given?

What is not given?



What tools will I use?

- number sentence
- chart, table
- number line
- manipulatives
- draw a picture

Find a good place to start, and begin solving.



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PERSEVERE in SOLVING them



Does my answer and/or my strategy make sense?



Try a new strategy if it isn't working.

What worked?

What didn't work?

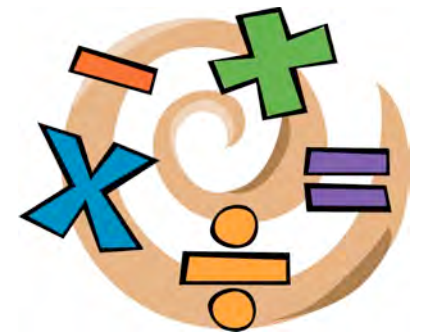


Try a different strategy to check my work.

How does my solution compare to others?

What can I learn from this?

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REASON ABSTRACTLY and QUANTITATIVELY

with numbers &
symbols out of
context

with numbers &
amounts in context

$$53 + \square = 75$$

Properties & Operations

$$53 - 4 = \square$$

Base Ten Number System



53 students get on the bus

4 students get off the bus

75 seats on the bus

25 miles per hour

traveled 66 miles in 3 days

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CONSTRUCT a VIABLE ARGUMENT

make
create
present

clear
understandable
accurate
possible

explanation
solution
method for
getting the
correct answer



SHOW HOW YOU GOT YOUR ANSWER,
AND
EXPLAIN WHY YOU USED THOSE NUMBERS
AND/OR OPERATIONS...
...IN A WAY THAT MAKES SENSE TO OTHERS.



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CRITIQUE the REASONING of others

I agree with _____
because _____

I do not understand _____
How did you get that?
Where is this part of the problem?

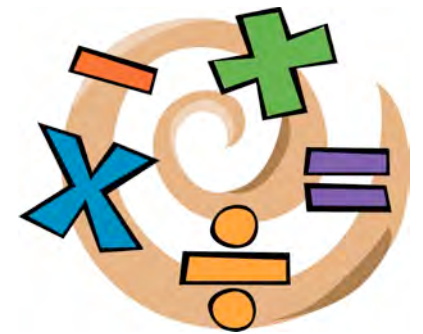
I disagree with _____
because _____



Why is that true?
What's the definition of _____ ?

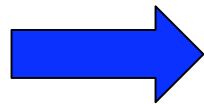


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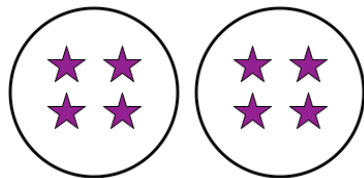
MODEL with MATHEMATICS

Write number sentences and equations for a given problem.

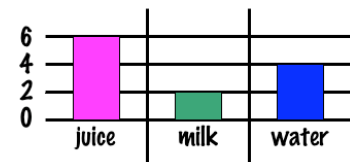
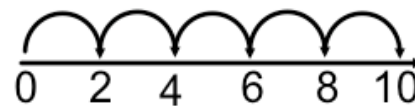


$$23 + 17 = 40$$

Create representations, tables, number lines, and graphs.



dimes	nickels	pennies
2	1	0
2	0	5
1	3	0
1	2	5



Write problems for a given number sentence or equation.

$$7 \times 6 = 42$$



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USE APPROPRIATE TOOLS STRATEGICALLY

Base Ten blocks

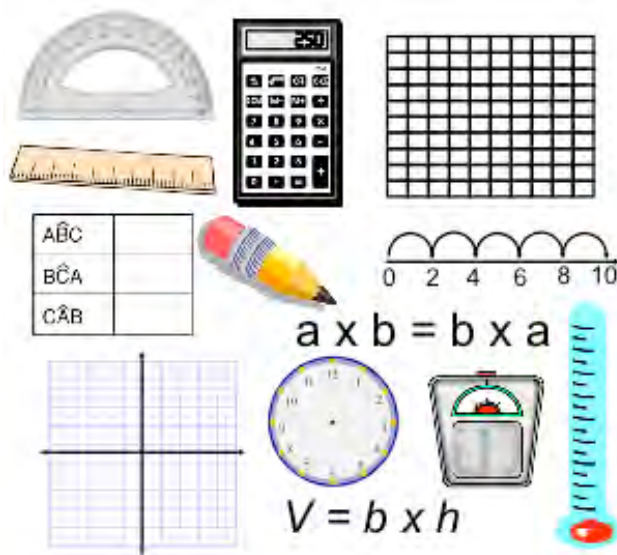
Unifix cubes

Estimation

Measuring tools

Number lines

Graph paper



Drawings

Tables

Charts

Organized lists

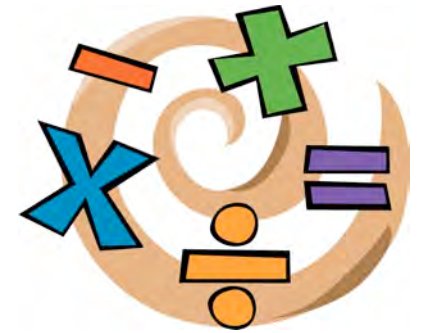
Calculator

Online search

Paper & pencil

Knowledge of numbers & properties

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ATTEND to PRECISION

be precise, accurate in...

Problem Solving



Communicating

Calculate **ACCURATE** answers.

Find an **EFFICIENT** method for calculating my answer.

Check my work:
Does my answer
MAKE SENSE?



Speak, Read, Write, and Listen
MATHEMATICALLY.

Correctly **USE:**

- Math **SYMBOLS**
- Math **VOCABULARY**
- **UNITS** of **MEASURE**

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LOOK FOR and MAKE USE of STRUCTURE

understanding parts, wholes, and patterns in...

Numbers & Shapes

Using Base 10 structure

Using Operations and Properties

$$56 + 23 =$$

$$56 + (2 \text{ tens} + 3) \rightarrow 56, 66, 76 + 3 = 79$$

The Distributive Property:

$$8 \times 7 =$$

$$8 \times (5 + 2) =$$

$$(8 \times 5) + (8 \times 2) =$$

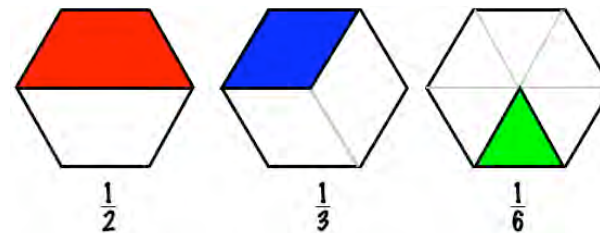
$$40 + 16 = 56$$

Sorting Shapes by Attributes

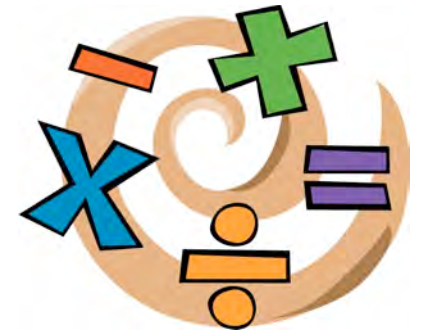
-number of sides

-number of right angles

Using dimensions to calculate area, volume



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LOOK FOR and EXPRESS

REGULARITY in REPEATED REASONING

Noticing repeated calculations and strategies
and finding general methods and short cuts

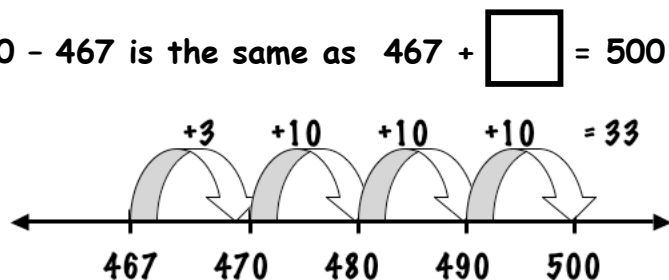
Using Doubles facts

$$5 + 8 =$$

$$5 + 5 + 3 =$$

$$10 + 3 = 13$$

500 - 467 is the same as $467 + \square = 500$



$3+3+3+3+3 \rightarrow$ five 3s added together = 5×3

5×3 has the same product as 3×5 (Commutative

$3 \times 5 \rightarrow 5, 10, 15 = 15$ Property)

Repeated subtraction is related to division.

Division can be thought of as a missing factor.

You have: Each costs: How many can you buy?

\$36

\$9

$\$36 - \$9 - \$9 - \$9 - \$9$

OR

$$\square \times \$9 = \$36$$

