Make sense of problems and persevere in solving them

When presented with a problem, I can make a plan, carry out my plan, and evaluate its success.

BEFORE...

EXPLAIN the problem to myself.

- *Have I solved a problem like this before?*

ORGANIZE information...

- *What is the question I need to answer?*
- *What is given?*
- *What is not given?*
- *What are the relationships between known and unknown quantities?*
- *What tools will I use?*
- *What prior knowledge do I have to help me?*

DURING...

PERSEVERE

MONITOR my work

CHANGE my plan if it isn't working out

ASK myself, "Does this make sense?"

AFTER...

CHECK

- *Is my answer correct?*
- *How do my representations connect to my algorithms?*

EVALUATE

- *What worked?*
- *What didn't work?*
- *What other strategies were used?*
- *How was my solution similar to or different from my classmates'?*

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Reason abstractly and quantitatively

I can use reasoning habits to help me contextualize and decontexualize problems.

CONTEXTUALIZE

I can take numbers and put them in a real-world context.

For example, if given
3 x 2.5 = 7.5
I can create a context:

I walked 2.5 miles per day for 3 days. I walked a total of 7.5 miles.

DECONTEXTUALIZE

I can take numbers out of context and work mathematically with them.

For example, if given
'I walked 2.5 miles per day for 3 days. How far did I walk?',
I can write and solve

3 x 2.5 = 7.5

Reasoning Habits include 1) *creating an understandable representation of the problem solved*, 2) *considering the units involved*, 3) *attending to the meaning of quantities*, and 4) *using properties to help solve problems*.

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Construct viable arguments and critique the reasoning of others

I can make conjectures and critique the mathematical thinking of others.

I can ***construct***, ***justify***, and ***communicate*** arguments by...

- considering context
- using examples and non-examples
- using objects, drawings, diagrams and actions

I can ***critique the reasoning of others*** by...

- listening
- comparing arguments
- identifying flawed logic
- asking questions to *clarify* or *improve arguments*

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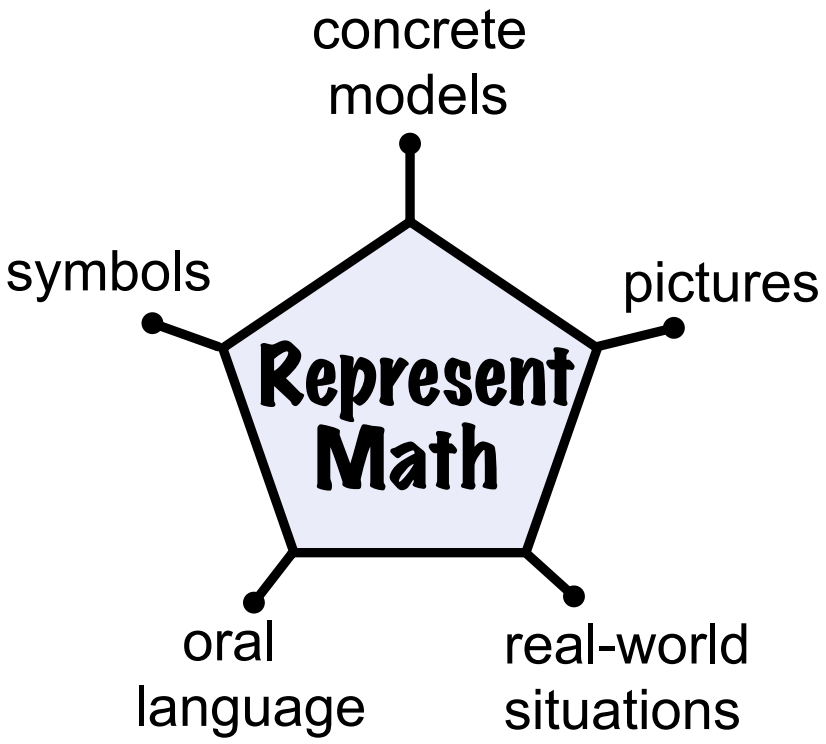
Model with mathematics

I can recognize math in everyday life and use math I know to solve everyday problems.

I can...

- make assumptions and estimate to make complex problems easier
- identify important quantities and use tools to show their relationships
- evaluate my answer and make changes if needed



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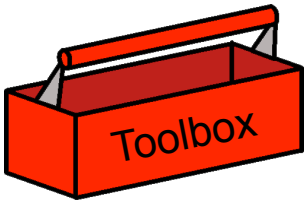
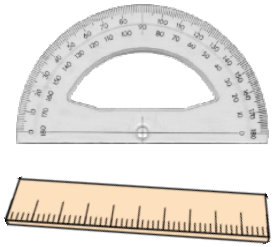
Use appropriate tools strategically

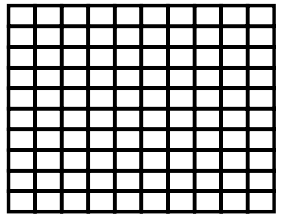
I know when to use certain tools to help me explore and deepen my math understanding.

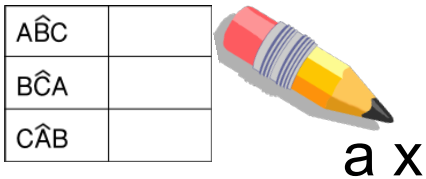
I have a math toolbox.

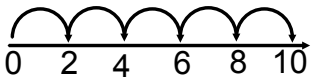


- I know *HOW* to use math tools.
- I know *WHEN* to use math tools.
- I can reason: *"Did the tool I used give me an answer that makes sense?"*

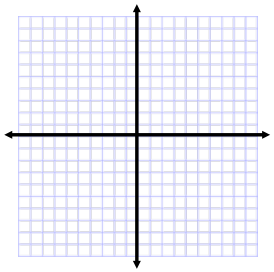


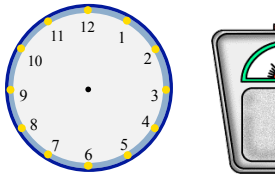






a x b = b x a





V = b x h

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Attend to precision

I can use precision when solving problems and communicating my ideas.

Problem Solving

- I can calculate *accurately*.
- I can calculate *efficiently*.
- My answer matches what the problem asked me to do – *estimate* or find an *exact answer*.

Communicating

- I can SPEAK, READ, WRITE, and LISTEN mathematically.
- I can correctly use...
  - math symbols
  - math vocabulary
  - units of measure

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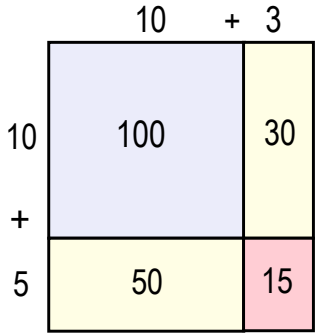
Look for and make use of structure

I can see and understand how numbers and spaces are organized and put together as parts and wholes.

Numbers

For Example:

- Base 10 structure
- operations and properties
- terms, coefficients, exponents



13 x 15

(10 + 3) x (10 + 5)

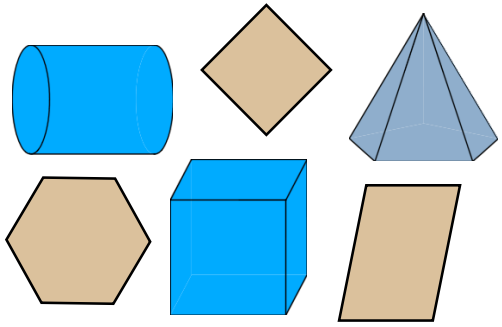
100 + 30 + 50 + 15

195

Spaces

For Example:

- dimension
- location
- attributes
- transformation



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Look for and express regularity in repeated reasoning

I can notice when calculations are repeated. Then, I can find more efficient methods and short cuts.

For example: 25 ÷ 11

$$
\begin{array}{r}
2.2727 \\
11\overline{)\,25.0000} \\
-22 \\
\hline
30 \\
-22 \\
\hline
80 \\
-77 \\
\hline
30 \\
-22 \\
\hline
80 \\
-77 \\
\hline
30
\end{array}
$$

I am repeating this calculation. The quotient is a repeating decimal.

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