Make sense of problems and persevere in solving them. Mathematical Practice 1

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?*
- *What do I know?*
- *What do I need to find out?*
- *What tools/strategies will I use?*

DURING...

PERSEVERE

MONITOR my work

ASK myself, "Does this make sense?"

CHANGE my plan if it isn't working out

AFTER...

CHECK

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

EVALUATE

- *What worked/didn't work?*
- *How was my solution similar or different from my classmates'?*

Reason abstractly and quantitatively.

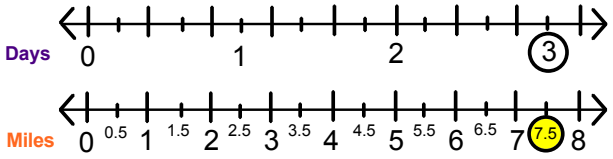
Mathematical Practice 2

I can contextualize numbers, decontextualize words, and use reasoning habits to help me make sense of problems.

Contextualize

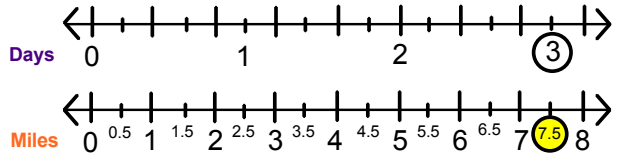
2.5 x 3 = 7.5

Sam walked 2.5 miles per day for 3 days.
How many total miles did he walk?



Decontextualize

Sam walked 2.5 miles per day for 3 days.
How many total miles did he walk?



2.5 x 3 = 7.5

Reasoning Habits

1) Make an understandable representation of the problem.
2) Think about the units involved.
3) Pay attention to the meaning of the numbers.
4) Use the properties of operations or objects.

Construct viable arguments and critique the reasoning of others. Mathematical Practice 3

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

I can make, justify (prove), and present arguments by...

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

I can critique the reasoning of others by...

- listening
- asking questions to clarify or improve arguments
- comparing strategies and arguments while identifying flawed logic

Model with mathematics.

Mathematical Practice 4

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

I can...

Kylie needs to read a book with 247 pages in 3 weeks. She's hoping to finish it in 2 weeks. About how many pages does she need to read per day?

→ Use **estimates** to make the problem simpler.

I will **round** to the whole page.

→ Find **important numbers**.

Pages to read: **247**

Weeks to read: **2 or 3**

↓ Use **tools** to **show relationships**.

Weeks to read	Pages to read
0	0
1	36
2	18
3	12

← Think about the **relationship** to find an **answer.**

Kylie will need to read 18 pages per day to finish in 2 weeks and 12 pages per day to finish in 3 weeks.

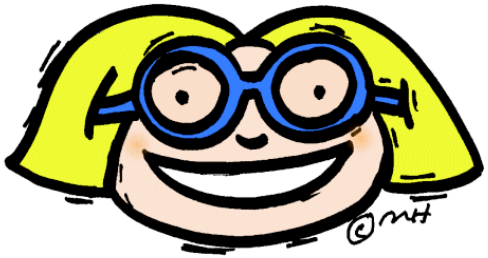
← Consider my **answer** -- **Does it make sense?**

The more days Kylie reads, the fewer pages per day she has to read. That makes sense!

...to solve everyday problems.

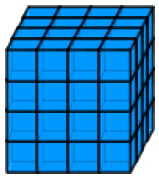
Use appropriate tools strategically.

Mathematical Practice 5



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

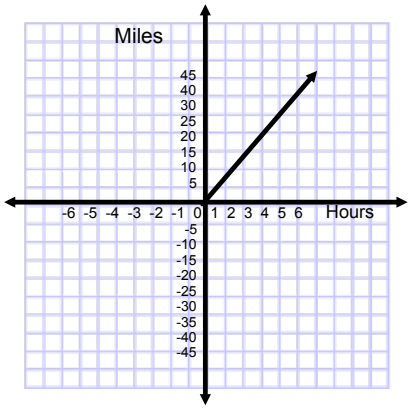
- I know *HOW* and *WHEN* to use math tools.
- I can reason: *"Did the tool I used give me an answer that makes sense?"*

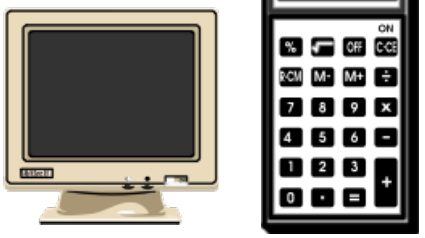


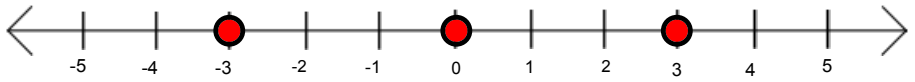
V = b x h

X	Y
1	100
2	200
3	300

a x b = b x a







Attend to precision.

Mathematical practice 6

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

Mathematicians attend to precision by using...

How much chocolate will each person get if 3 people share 1/2 lb. of chocolate equally?

symbols

$\frac{1}{2}$ lb. ÷ 3 people = $\frac{1}{6}$ lb. of chocolate each

units of measure

context

- math vocabulary with clear definitions
- symbols that have meaning
- context labels
- units of measure
- calculations that are accurate and efficient

Look for and make use of structure.

Mathematical Practice 7

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

Numbers

For Example:

REAL NUMBER SYSTEM

Rational Numbers
2, -3, 1/4, 0, 2.9...
Number that can be expressed as a ratio of two integers

Integers
0, 3, -3….
Whole numbers and their opposites

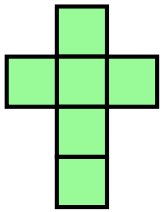
Whole Numbers
0,1, 2, 3...

Natural Numbers
1, 2, 3…

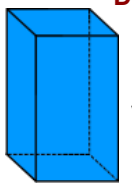
Irrational Numbers
$\sqrt{2}$, π, 0.121121112...
Real Numbers that cannot be expressed as a ratio of two integers

Spaces

For Example:



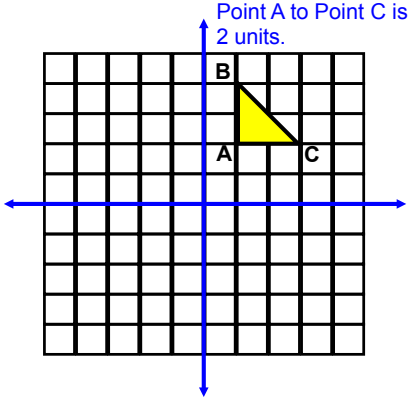
Dimension ~ Nets



V = bh

Measurement ~ Volume

The distance from Point A to Point C is 2 units.



Location ~ Distance

Look for and express regularity in repeated reasoning. Mathematical Practice 8

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

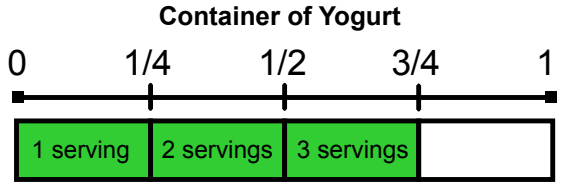
As I work…

…I think about what I'm trying to figure out while I pay attention to the details.

…I evaluate if my results are reasonable.

EXAMPLE: I have a container of yogurt that is ¾ full. One serving of yogurt is ¼ of the container. How many servings are left in the container?
(THINK: How many ¼'s are in ¾'s?)

I can notice that ¼ is repeated and draw a model to figure out the number of servings left in the container.



Once I understand division of fractions, I can use a short cut to solve it like this.

$$\frac{3}{4} \div \frac{1}{4} = \frac{3}{4} \times \frac{4}{1} \rightarrow \frac{3}{4} \times \frac{4}{1} = \frac{12}{4} \rightarrow \frac{12}{4} = \frac{3}{1} \rightarrow \frac{3}{1} = 3$$