

# 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 check its success.**



## **BEFORE...**

**EXPLAIN** the problem to myself.

**MAKE A PLAN** to solve the problem

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

## **DURING...**

**PERSEVERE** (Stick to it!)

**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'?*



# Construct viable arguments and critique the reasoning of others.

Mathematical Practice 3



***I can make logical arguments and respond to the mathematical thinking of others.***

***I can make and present arguments by...***

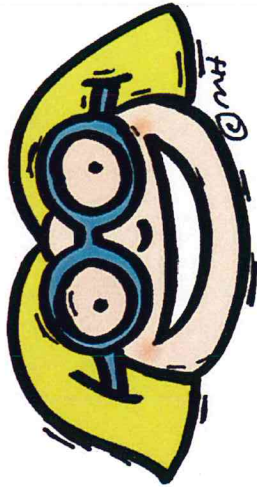
- using objects, drawings, diagrams and actions
- using examples and non-examples
- relating to contexts

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

- listening
- asking and answering questions
- comparing strategies and arguments

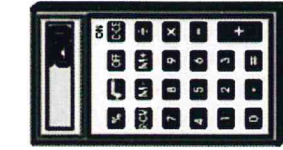
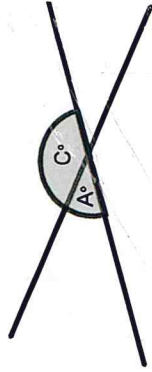
# Use appropriate tools strategically.

Mathematical Practice 5

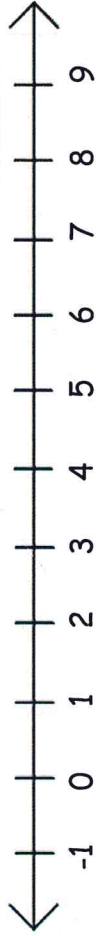
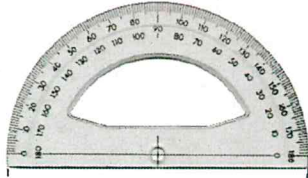
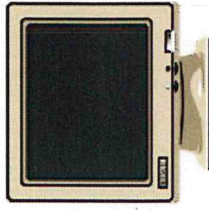
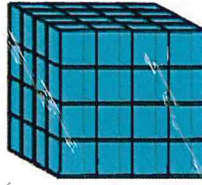


*I can use certain tools to help me explore and deepen my math understanding.*

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



$$a \times b = b \times a$$





# Look for and make use of structure.

Mathematical Practice 7

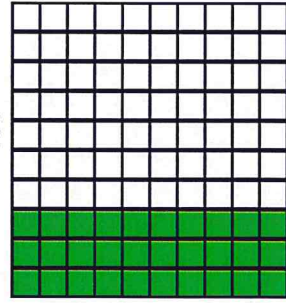
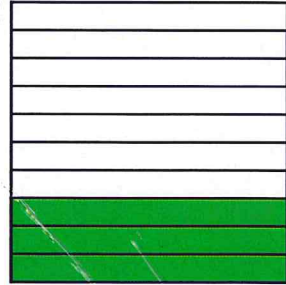


*I can see and understand how numbers and spaces are organized and put together as parts and wholes.*

## Numbers

For Example:

I know that  $\frac{3}{10}$  is equal to  $\frac{30}{100}$ .

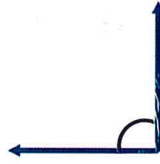


$$\text{So, } \frac{3}{10} + \frac{4}{100} = \frac{34}{100}.$$

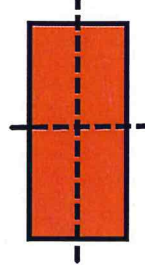
**Equivalent Fractions**

## Spaces

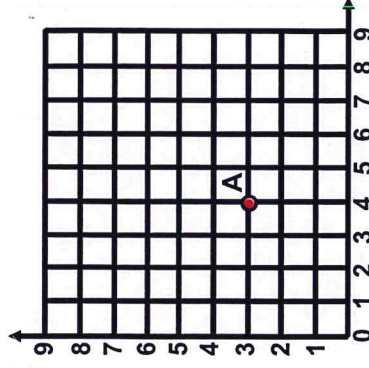
For Example:



**Lines and Angles**



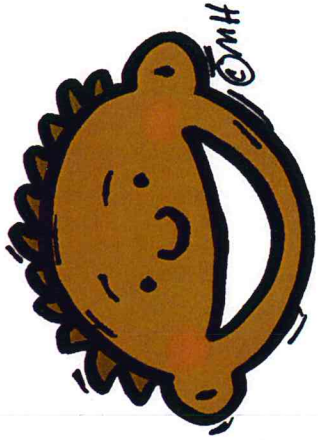
**Symmetry**



**Location**

# Attend to precision.

Mathematical practice 6



*I can be precise when solving problems and clear when communicating my ideas.*

Mathematicians communicate with others using...

symbol: equal  
↓ (the same as)

48 inches = 4 feet

↑ units of ↓  
measure

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



# Reason abstractly and quantitatively.

Mathematical Practice 2

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

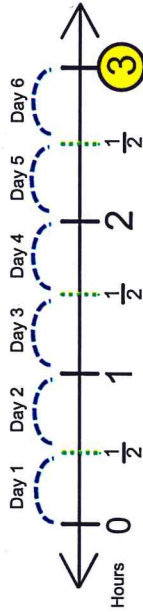


**Contextualize** (Numbers to Words)

$$\frac{1}{2} \times 6 = 3 \text{ or } 6 \times \frac{1}{2} = 3$$

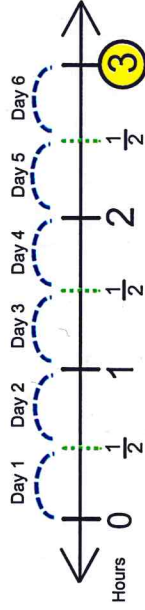


Mary practices the piano  $\frac{1}{2}$  hour a day for 6 days.  
How many total hours does she practice?



**Decontextualize** (Words to Numbers)

Mary practices the piano  $\frac{1}{2}$  hour a day for 6 days.  
How many total hours does she practice?



$$\frac{1}{2} \times 6 = 3 \text{ or } 6 \times \frac{1}{2} = 3$$

## 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.



# 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.***

There are many ways to decompose  $\frac{3}{8}$  because it is composed of repeated  $\frac{1}{8}$  s.  
**I CAN.....**

***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.***

***....draw*** a whole and shade in three  $\frac{1}{8}$  s parts.



***....add*** eighths.

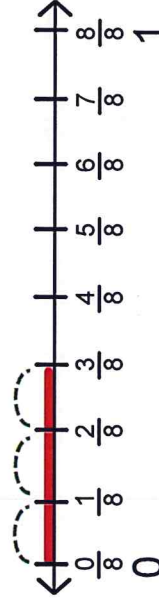
$$\frac{3}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$$

***....count*** by eighths.

(one-eighth, two eighths, three eighths)

$$\frac{3}{8} = \frac{1}{8}, \frac{1}{8}, \frac{1}{8}$$

***....jump*** three  $\frac{1}{8}$  size jumps on a number line.



# Model with mathematics.

Mathematical Practice 4



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

**I can...**

My box turtle is getting a new tank. He is 5 1/2" long and 3" tall. One side length of the tank needs to be 5 times his length. How long will the length of the tank need to be?



Use estimates to make the problem simpler.



I will round 5 1/2" to 6".

Find important numbers.

**Turtle:** About 6" long  
**Tank:** 5 times the length of the turtle



Consider my answer – **Does it make sense?** Think about the relationship to find an answer.

I thought about the problem again and a 30" side length on the tank makes sense!  
The tank (30") is 5 times bigger than the turtle length (6").

Turtle Length (inches)	Tank Length (inches)
4	20
5	25
<b>6</b>	<b>30</b>
7	35
8	40

Use tools to show relationships.



***...to solve everyday problems.***