Math 8 Function Unit
Day 1

youcubed

Quick Write

On the ***next page*** in your **composition book,** write the GQ and LG. Then write your ideas about the GQ and LG.

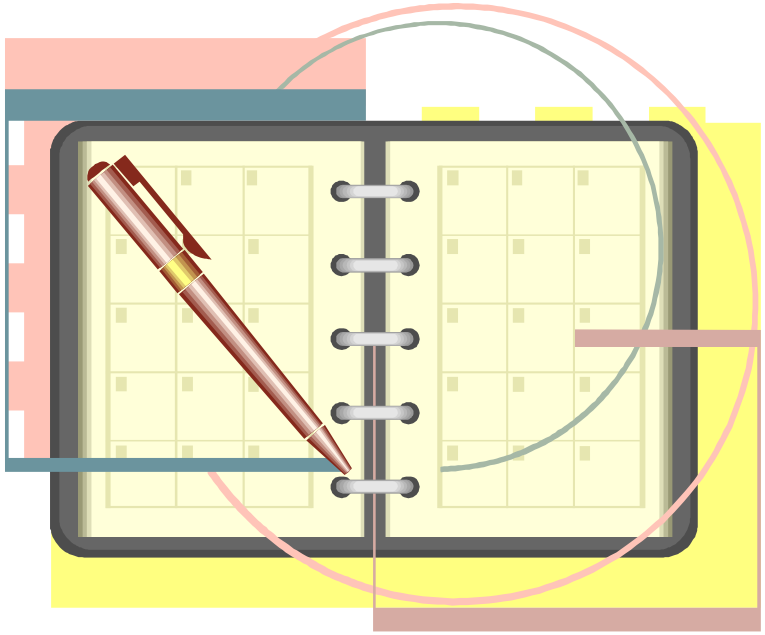
GQ: Why do mathematicians look for patterns?

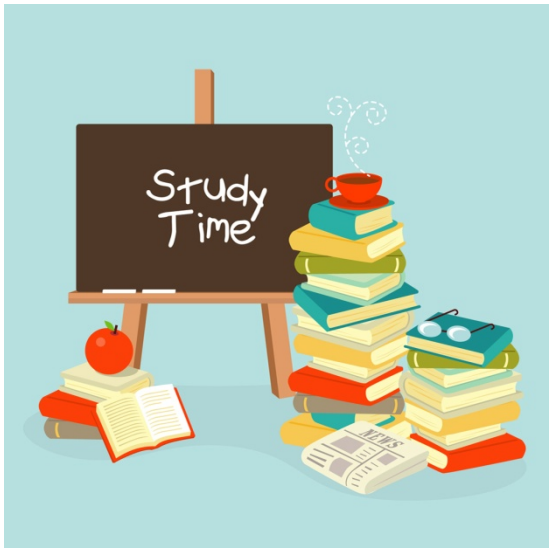
LG: I can ask clarifying questions.

youcubed

Record Tonight's Homework

Part 1: # 4, 5, 7 (Border Problem)
Part 2: Border Problem Part 1c & 1d





youcubed

Guiding Question

Why do mathematicians look for patterns?

Language Goal

I can ask clarifying questions.

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The Border Problem Introduction

Without counting every square one by one, how can you determine how many squares are on the outside border of this 10-by-10 figure?

youcubed

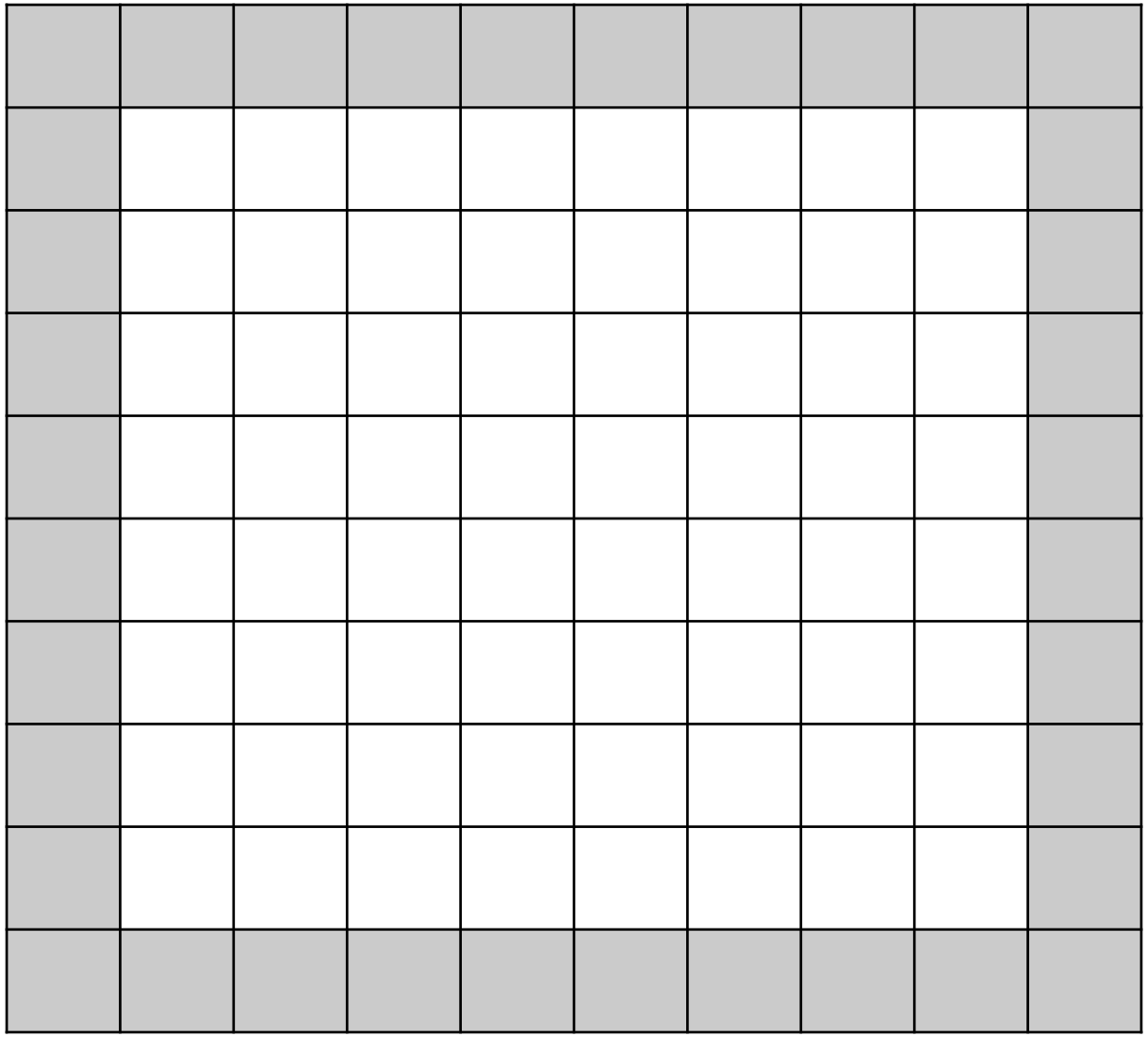

Figure 10

youcubed

The Border Problem Part 1

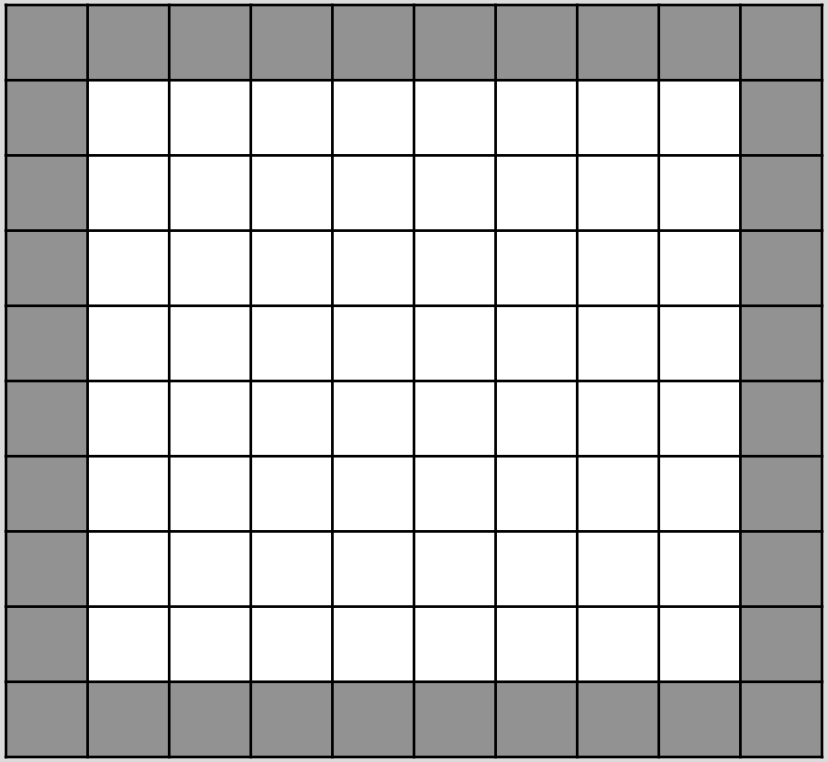

Figure 10

a) How many colored squares are in figure 6?

b) How many colored squares are in figure 1,006?

Explain how you know.

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Homework: Border Problem Part 1 c & d

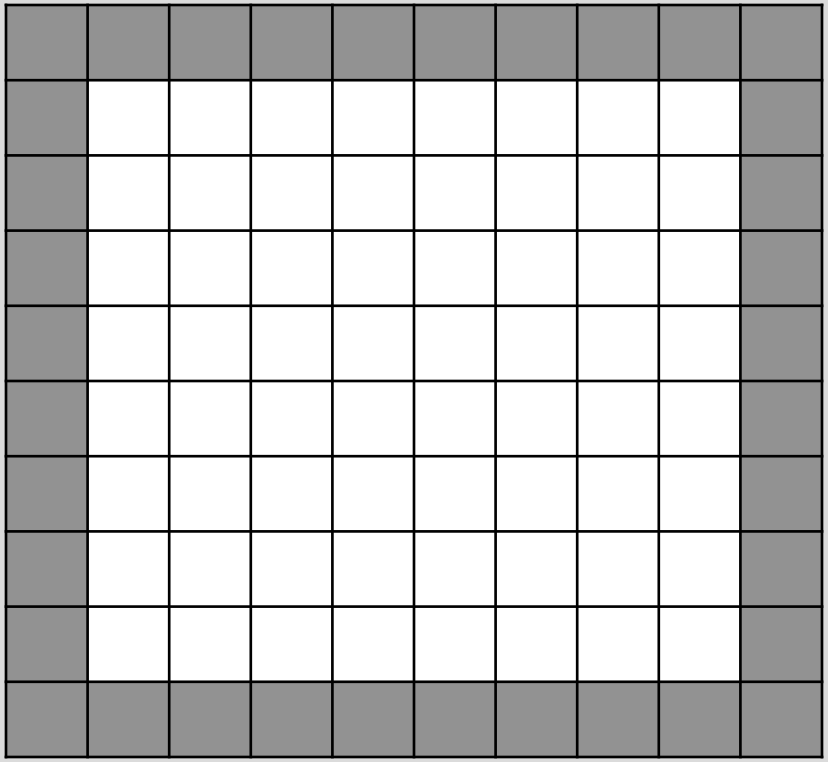


Figure 10

c) How many colored squares are in <u>figure 1×10^6</u>?

d) How can you figure out how many colored squares will be in <u>any figure</u>?

Explain how you know.

youcubed

Math 8 Function Unit
Day 2

youcubed

Quick Write

On the ***next page*** in your **composition book,** write the GQ and LG. Then write your ideas about the GQ and LG.

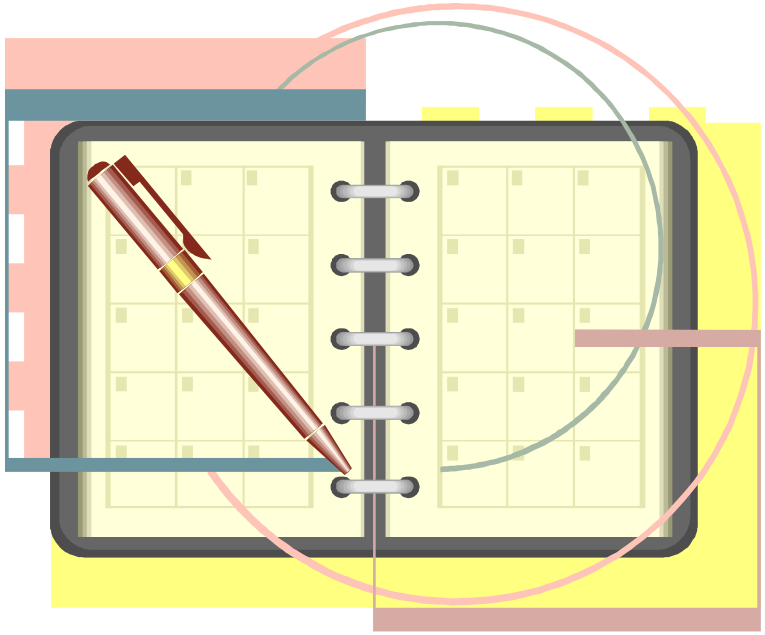
GQ: How are the different methods for figuring out the number of border squares similar and/or different to each other?

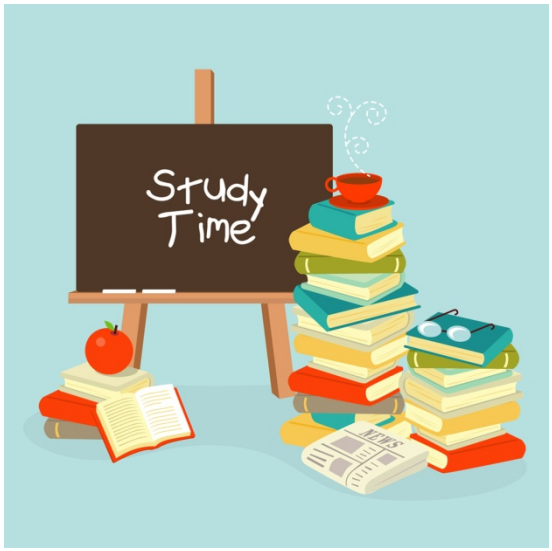
LG: I can ask clarifying questions.

youcubed

Record Tonight's Homework

Part 1: # 4, 5, 7 (Border Problem)
Part 2: Border Problem Part 2b (256 Squares)





youcubed

Guiding Question

How are the different methods for figuring out the number of border squares similar and/or different to each other?

Language Goal

I can ask clarifying questions.

youcubed

Debrief Homework Part 1c & 1d

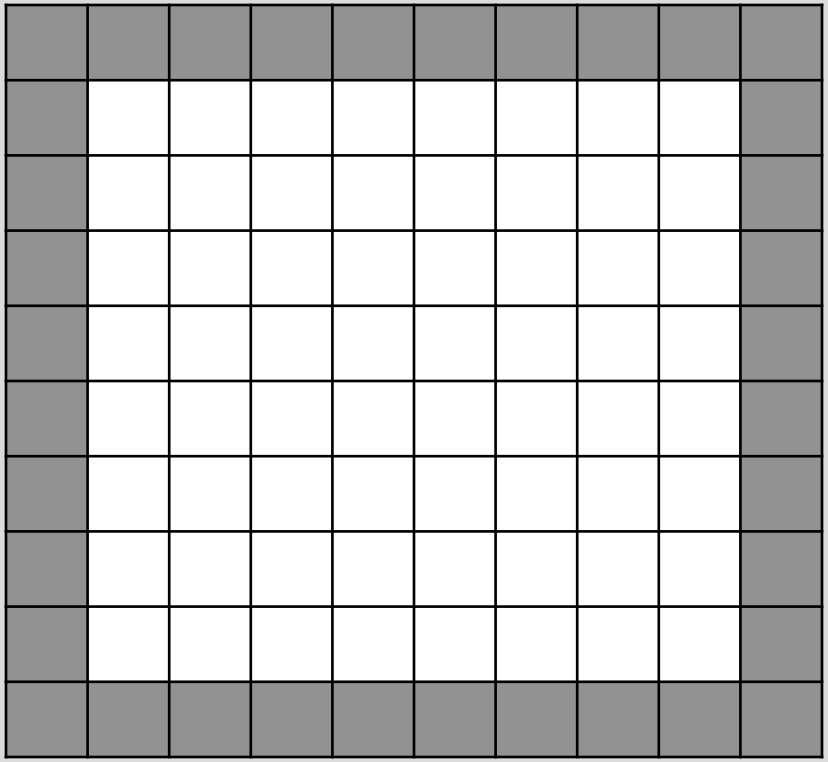


Figure 10

c) How many colored squares are in <u>figure 1×10^6</u>?

d) How can you figure out how many colored squares will be in <u>any figure</u>?

Explain how you know.

youcubed

The Border Problem Part 2 a & b

a) If you have **64 squares**, can you use all of them to make a square border? If you can, what is the side length of the square? Explain your thinking with mathematical justification.

b) If you have **any number of squares**, how can you figure out if you can make the square border using all of the squares?

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Homework: Border Problem Part 2c

c) If you have **256 squares**, can you use all of them to make a square border? If you can, what is the side length of the square? Explain your thinking with mathematical justification.

youcubed

Math 8 Function Unit
Day 3

youcubed

Quick Write

On the ***next page*** in your **composition book**, write the GQ and LG. Then write your ideas about the GQ and LG.

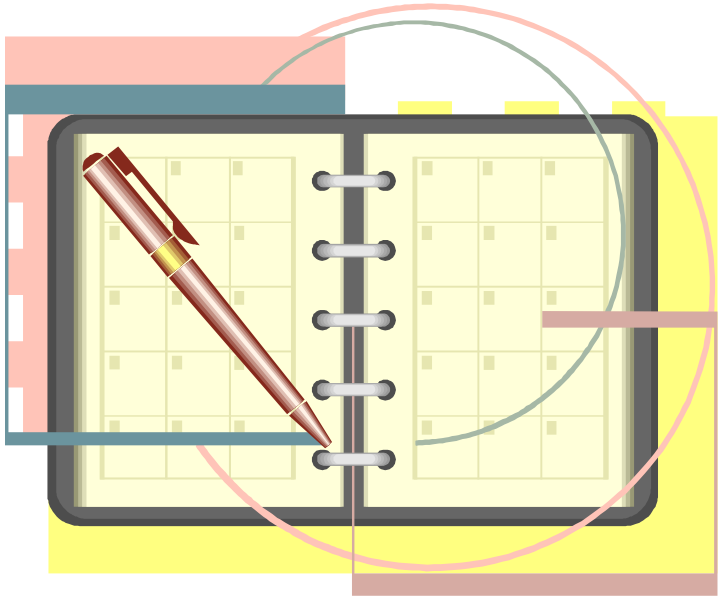
GQ: How did I determine if I could use all 256 squares to make a border?

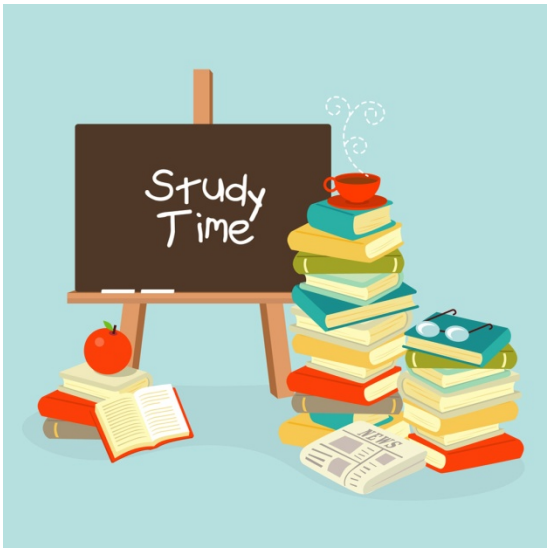
LG: I can ask clarifying questions.

youcubed

Record Tonight's Homework

Part 1: # 2, 7 (Pattern 4.0)
Part 2: Pattern 4.1





youcubed

Guiding Question

How did I determine if I could use all 256 squares to make a border?

Language Goal

I can ask clarifying questions.

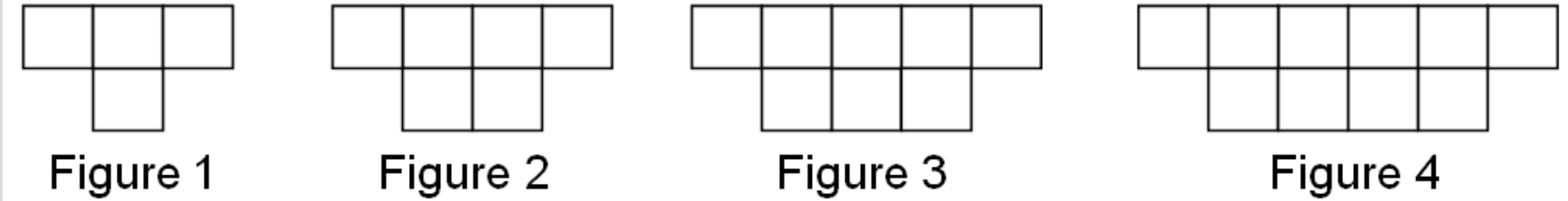
youcubed

Debrief Homework Part 2 c

c) If you have **256 squares**, can you use all of them to make a square border? If you can, what is the side length of the square? Explain your thinking with mathematical justification.

youcubed

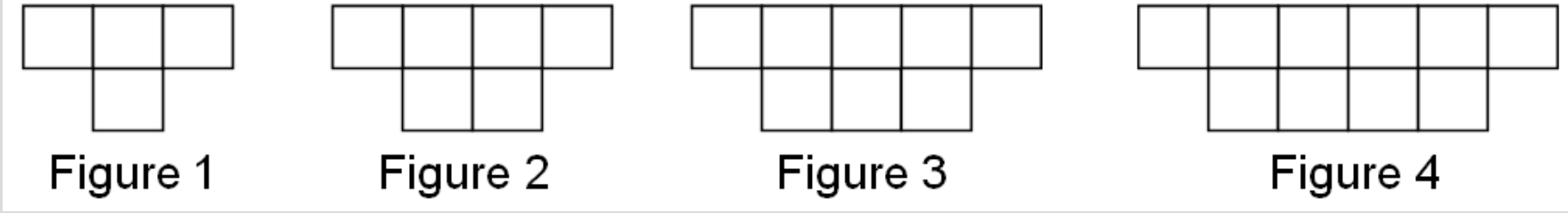
Pattern 4.0



a) How do you see the pattern growing?
b) How many squares will be in Figure 10?
c) How many squares will be in Figure 100?

youcubed

Pattern 4.0



d) How can you figure out how many squares will be in any figure?

youcubed

Number Transformer Challenge

Directions:

• You will receive one clue at a time to solve the challenge. Your goal is to use the least amount of clues possible.

•The clue will show a number going into the "Number Transformer Machine." In the machine, the number is transformed through a series of mathematical operations and the resulting number will come out.

•Your challenge is to figure out how the original number is being transformed in the machine. Every original number I show you will be transformed using the same mathematical operations.

youcubed

Number Transformer Challenge #1

How does the number change inside of the box?

youcubed

Number Transformer Challenge #1

How does the number change inside of the box?

youcubed

Number Transformer Challenge #1

How does the number change inside of the box?

youcubed

Number Transformer Challenge #1

How does the number change inside of the box?

youcubed

New Challenge

youcubed

Number Transformer Challenge #2

How does the number change inside of the box?

youcubed

Number Transformer Challenge #2

How does the number change inside of the box?

youcubed

Number Transformer Challenge #2

How does the number change inside of the box?

youcubed

Number Transformer Challenge #2

How does the number change inside of the box?

youcubed

Homework Pattern 4.1

a) How do you see the pattern growing?

b) How many toothpicks are in figure 7?

c) How many toothpicks are in figure 507?

youcubed

Math 8 Function Unit
Day 4

youcubed

Quick Write

On the ***next page*** in your **composition book**, write the GQ and LG. Then write your ideas about the GQ and LG.

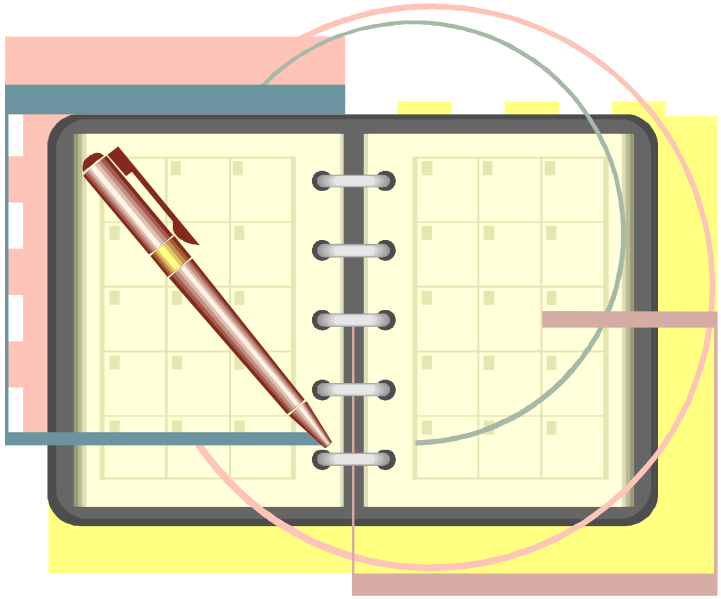
GQ: How did I see the pattern growing? (HW Pattern 4.1)

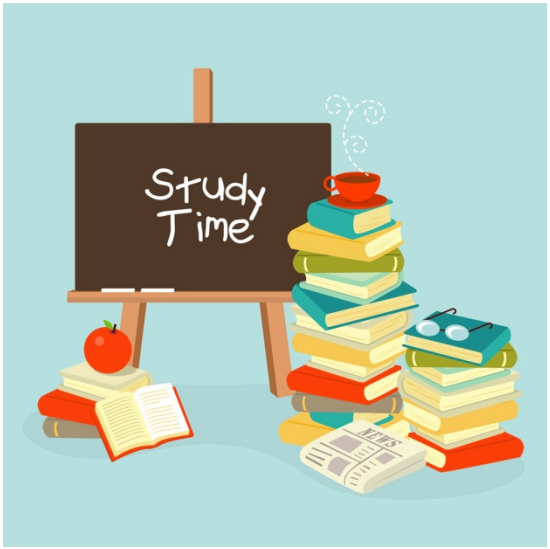
LG: I can ask clarifying questions.

youcubed

Record Tonight's Homework

Part 1: # 4, 5 (about Pattern 4.1)
Part 2: Pattern 4.2





youcubed

Guiding Question

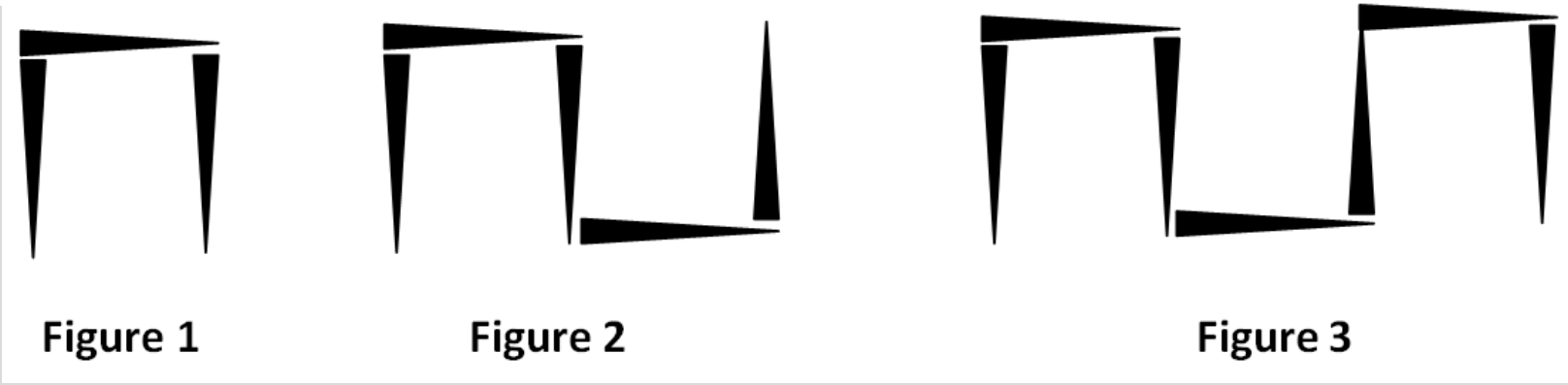
How did I see the pattern growing?
(HW Pattern 4.1)

Language Goal

I can ask clarifying questions.

youcubed

Debrief Homework: Pattern 4.1



a) How do you see the pattern growing?

b) How many toothpicks are in figure 7?

c) How many toothpicks are in figure 507?

*Discuss your ideas in your group for 10 minutes.

* Be ready to present your ideas to the class.

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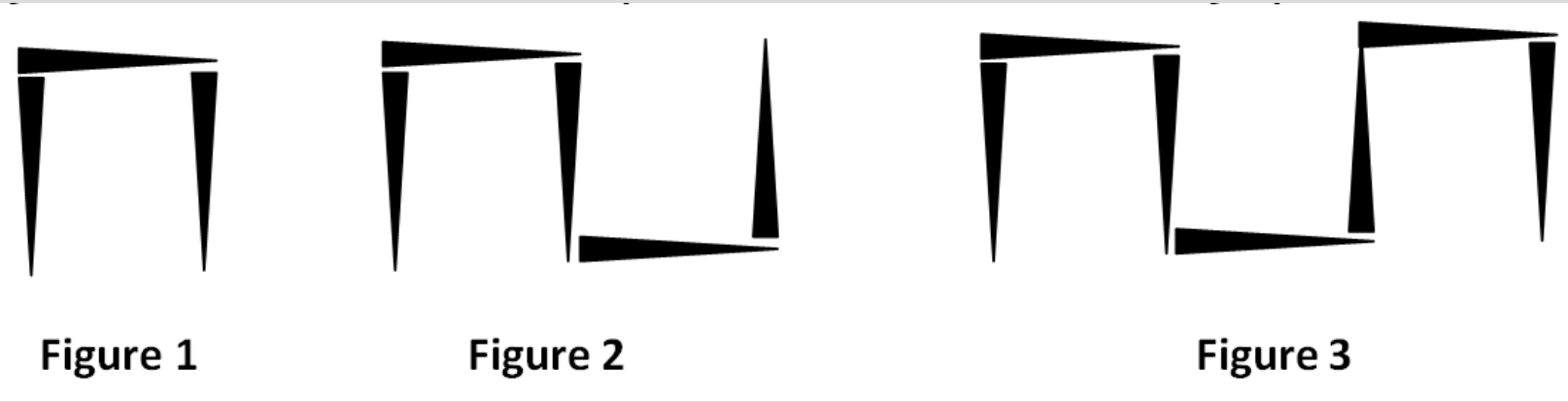
Pattern 4.1



d) How can you figure out how many toothpicks will be in any figure?

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Number Transformer Challenge #3

How does the number change inside of the box?

youcubed

Number Transformer Challenge #3

How does the number change inside of the box?

youcubed

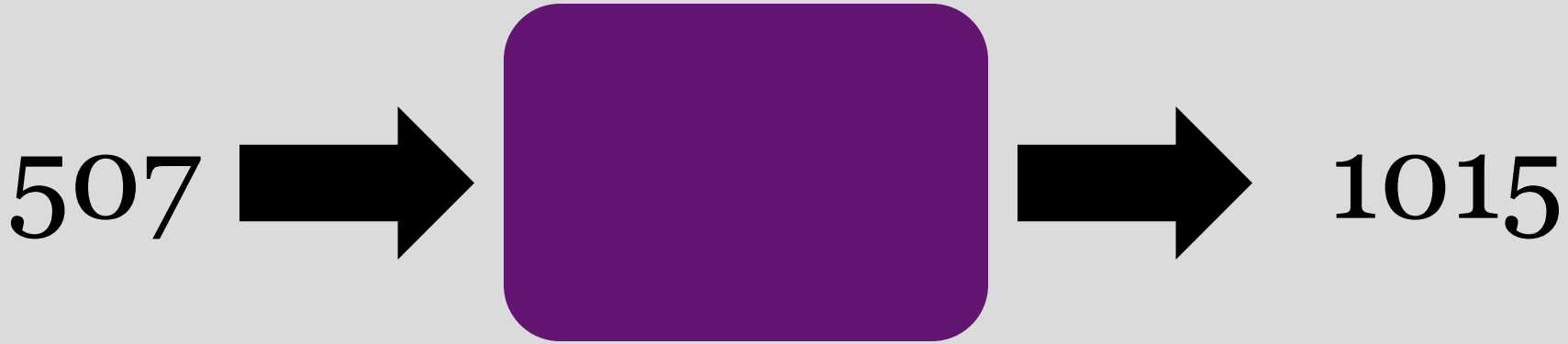
Number Transformer Challenge #3

How does the number change inside of the box?

youcubed

Number Transformer Challenge #3

How does the number change inside of the box?



youcubed

New Challenge

youcubed

Number Transformer Challenge #4

How does the number change inside of the box?

youcubed

Number Transformer Challenge #4

How does the number change inside of the box?

youcubed

Number Transformer Challenge #4

How does the number change inside of the box?

youcubed

Number Transformer Challenge #4

How does the number change inside of the box?

youcubed

Homework Pattern 4.2

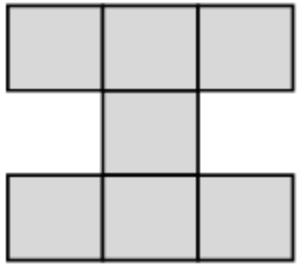


Figure 1

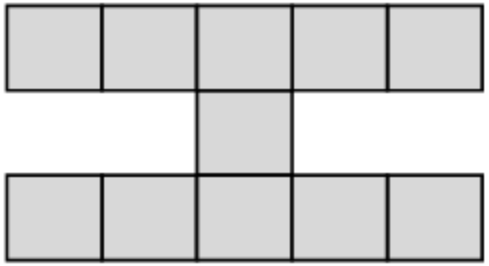


Figure 2

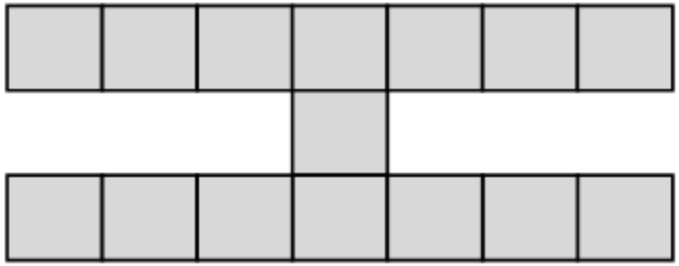


Figure 3

a) How do you see the figure growing?

b) How many squares are in figure 8?

c) How many squares are in figure 808?

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Math 8 Function Unit
Day 5

youcubed

Quick Write

On the ***next page*** in your **composition book**, write the GQ and LG. Then write your ideas about the GQ and LG.

GQ: How did I see the pattern growing? (HW Pattern 4.2)

LG: I can ask clarifying questions.

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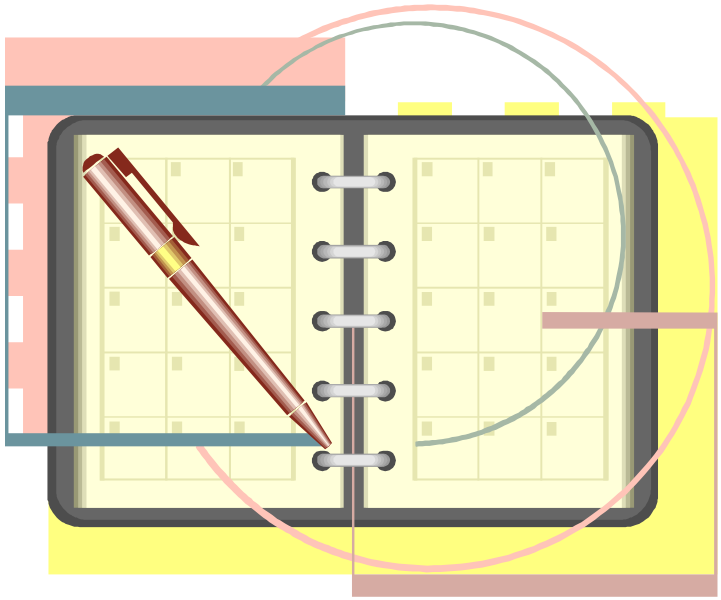
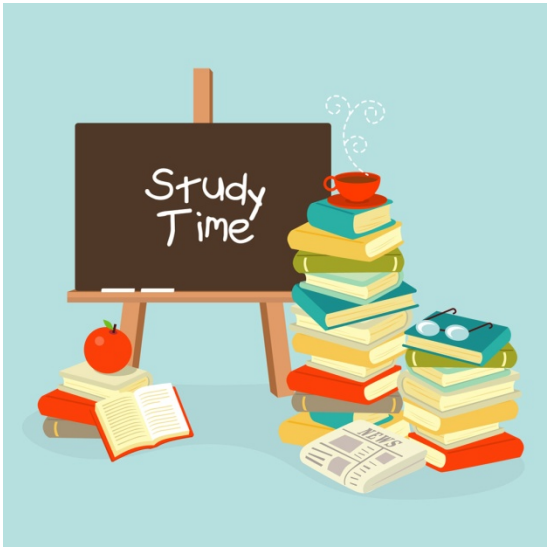
Record Tonight's Homework

Part 1: #7 (# Transformer)
Part 2: Stair-like Structure Problem a, b, c





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Watch Pattern Video

What is a mathematical proof?

http://www.youtube.com/watch?v=piyGXW_gMbc

youcubed

Guiding Question

How did I see the pattern growing?
(HW Pattern 4.2)

Language Goal

I can ask clarifying questions.

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Debrief Homework: Pattern 4.2

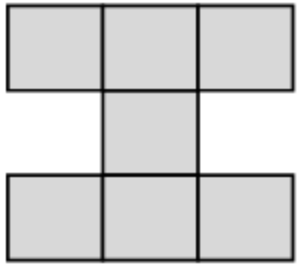


Figure 1

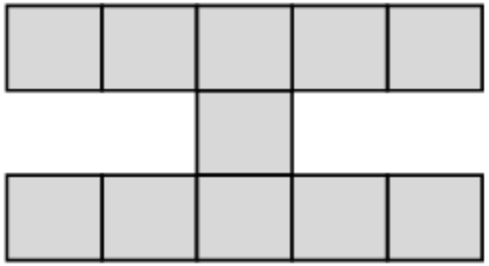


Figure 2

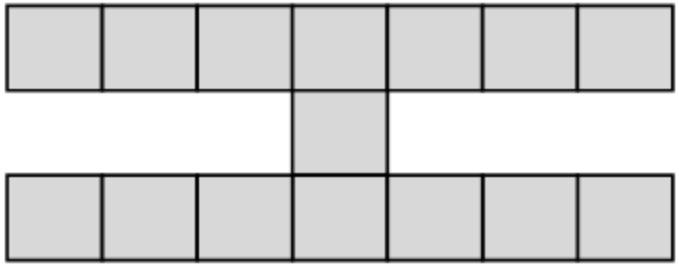


Figure 3

a) How do you see the figure growing?

b) How many squares are in figure 8?

c) How many squares are in figure 808?

youcubed

Pattern 4.2

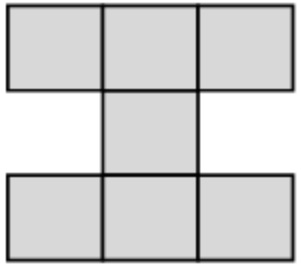


Figure 1

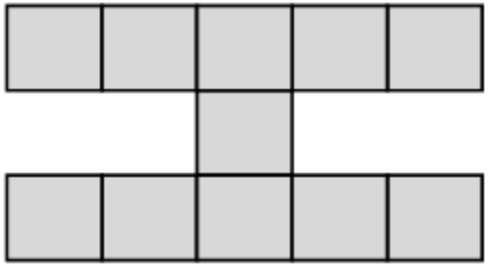


Figure 2

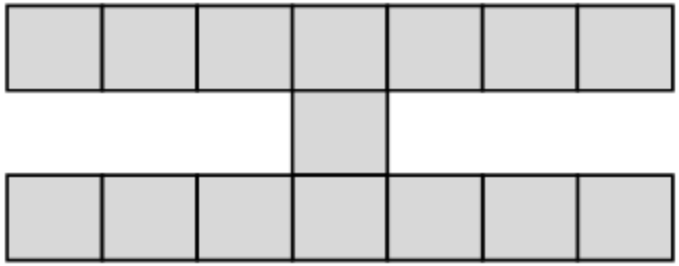


Figure 3

d) How can you figure out how many squares will be in any figure?

youcubed

Number Transformer Challenge #5

How does the number change inside of the box?

youcubed

Number Transformer Challenge #5

How does the number change inside of the box?

youcubed

Number Transformer Challenge #5

How does the number change inside of the box?

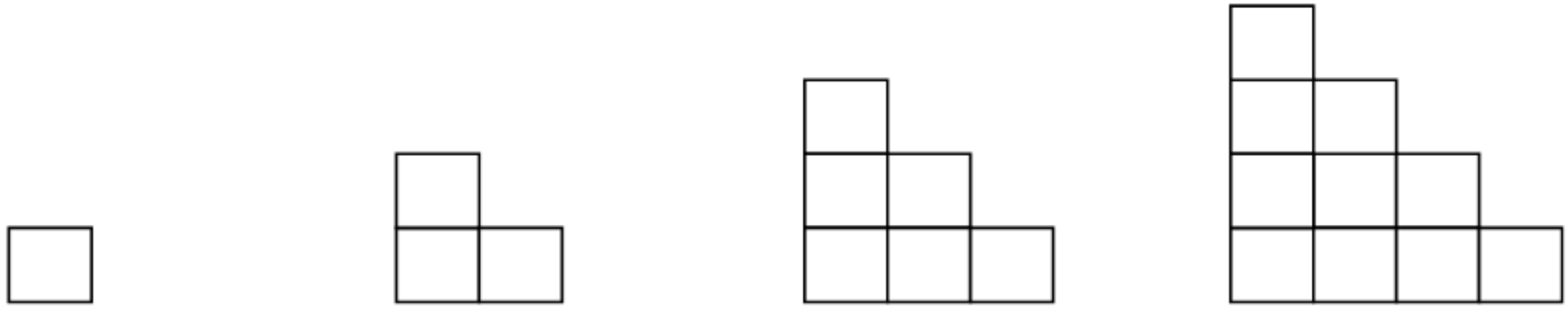
youcubed

Number Transformer Challenge #5

How does the number change inside of the box?

youcubed

Homework: Stair-like Structure Problem



a) How do you see the pattern growing?

b) How many squares are in figure 10?

c) How many squares are in figure 55?

Explain how you know.

youcubed

Math 8 Function Unit
Day 6

youcubed

Quick Write

On the ***next page*** in your **composition book**, write the GQ and LG. Then write your ideas about the GQ and LG.

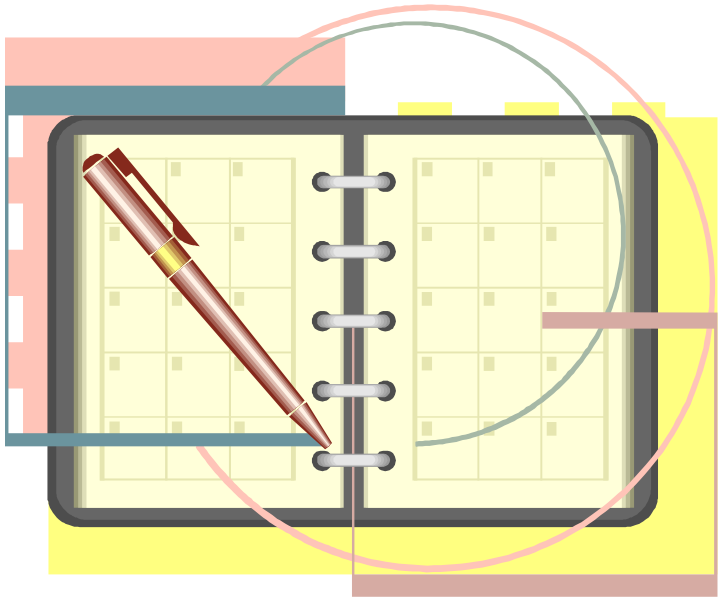
GQ: How many squares would be in figure 1,000 of the Stair-like Structure Problem?

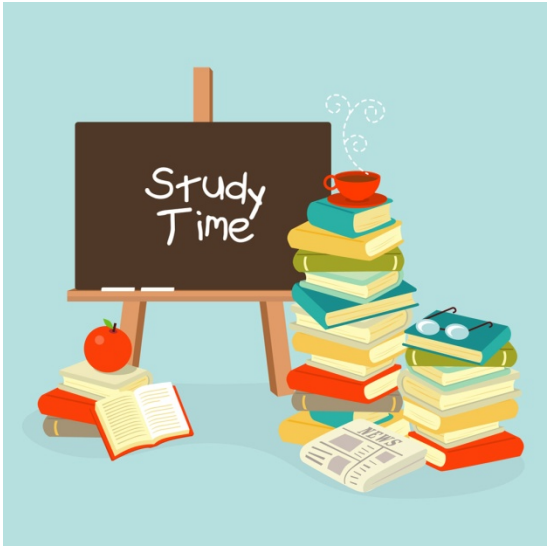
LG: I can ask clarifying questions.

youcubed

Record Tonight's Homework

Part 1: #5, #7
Part 2: Stair-like Structure Problem d & e





youcubed

Guiding Question

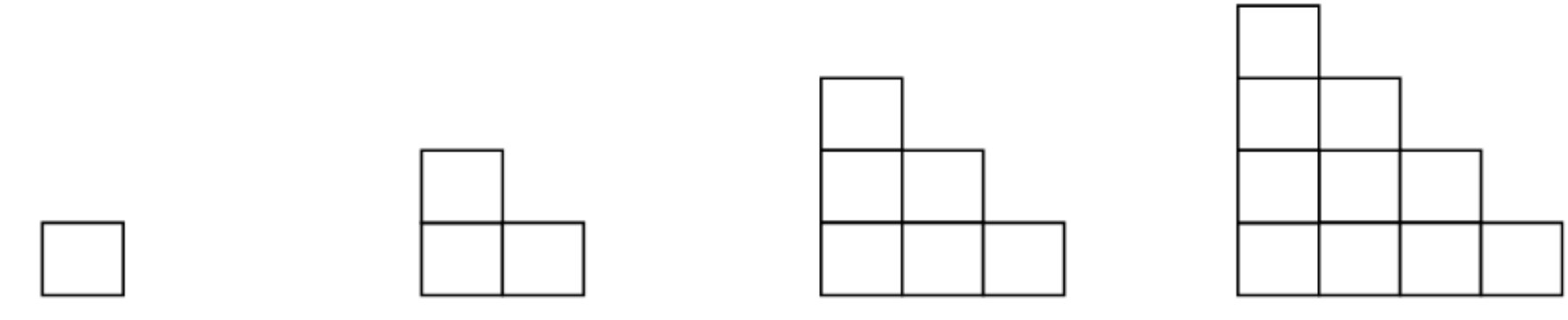
How many squares would be in figure 1,000 of the Stair-like Structure Problem?

Language Goal

I can ask clarifying questions.

youcubed

Debrief Homework: Stair-like Structure Problem



a) How do you see the pattern growing?

b) How many squares are in figure 10?

c) How many squares are in figure 55?

Explain how you know.

youcubed

Number Transformer Challenge #6

How does the number change inside of the box?

youcubed

Number Transformer Challenge #6

How does the number change inside of the box?

youcubed

Number Transformer Challenge #6

How does the number change inside of the box?

youcubed

Number Transformer Challenge #6

How does the number change inside of the box?

youcubed

Homework: Stair-like Structure Problem d & e

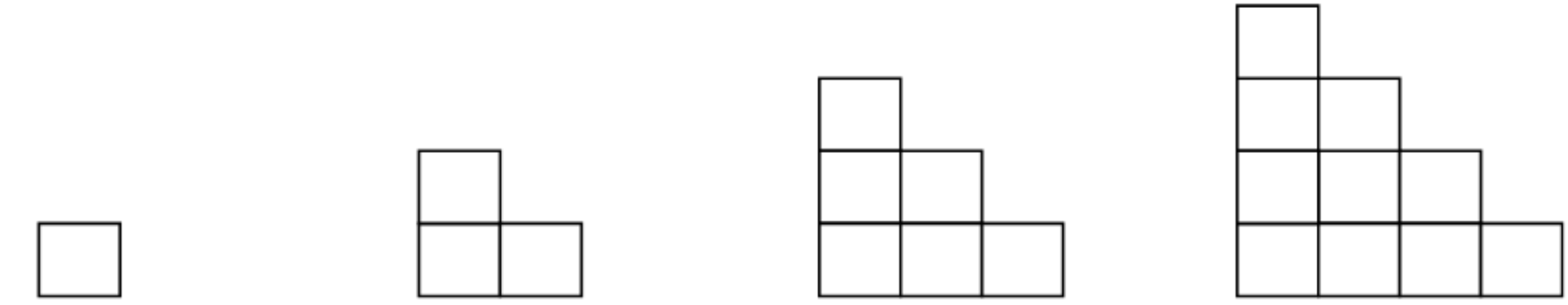


Figure 1 Figure 2 Figure 3 Figure 4

d) Can you use 190 squares to make a stair-like structure? Mathematically justify your answer.

e) How can you figure out how many total squares are in any figure?

youcubed

Math 8 Function Unit
Day 7

youcubed

Quick Write

On the ***next page*** in your **composition book**, write the GQ and LG. Then write your ideas about the GQ and LG.

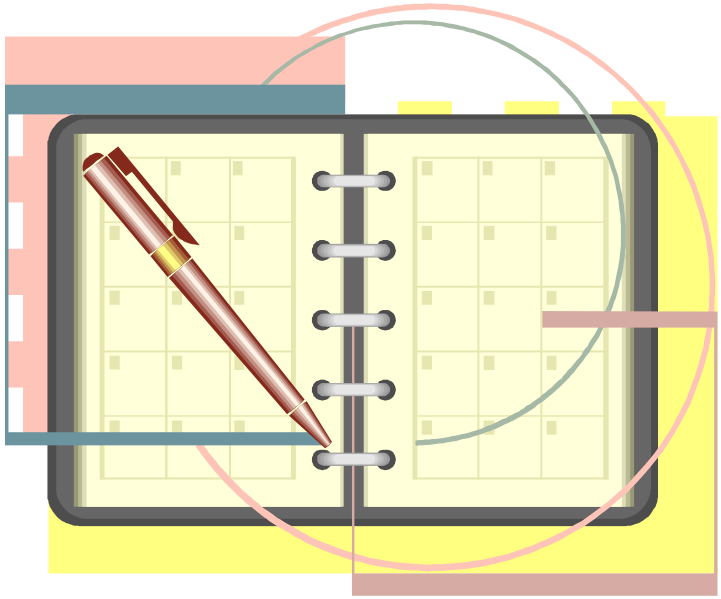
GQ: How can I make a general rule for the stair-like structure problem?

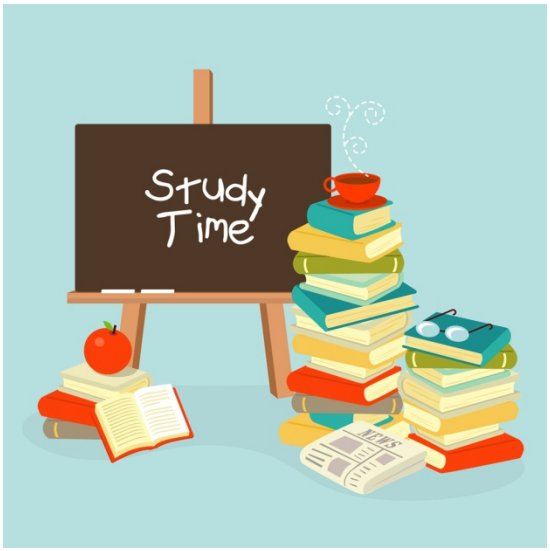
LG: I can ask clarifying questions.

youcubed

Record Tonight's Homework

Part 1: #1, #7
Part 2: Stair-like Structure Problem f





youcubed

Guiding Question

How can I make a general rule for the stair-like structure problem?

Language Goal

I can ask clarifying questions.

youcubed

Debrief Homework: Stair-like Structure Problem

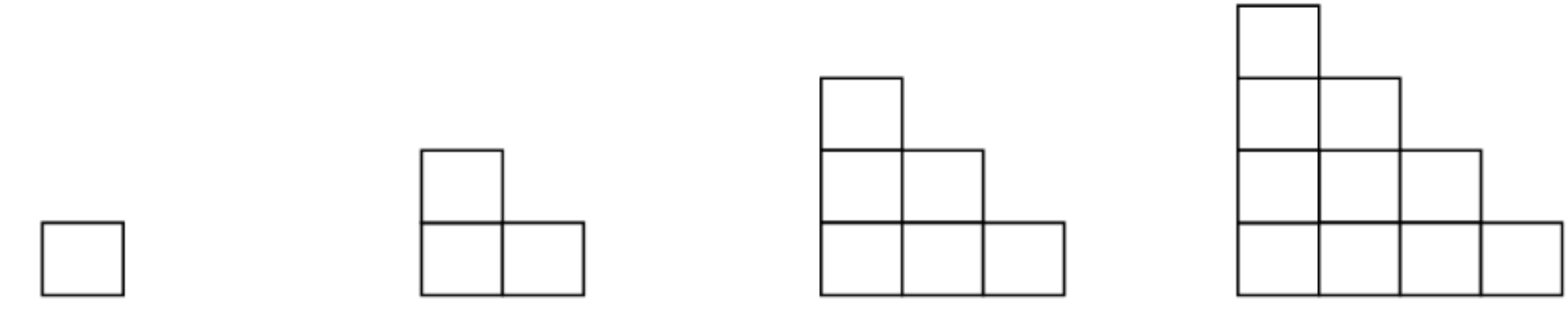


Figure 1 Figure 2 Figure 3 Figure 4

d) Can you use 190 squares to make a stair-like structure? Mathematically justify your answer.

e) How can you figure out how many total squares are in any figure?

youcubed

Generalize the Stair-like Structure Problem

Figure 1

Figure 2

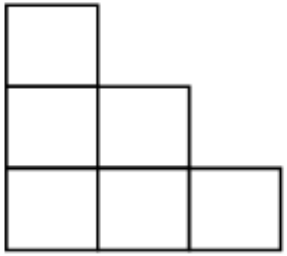


Figure 3

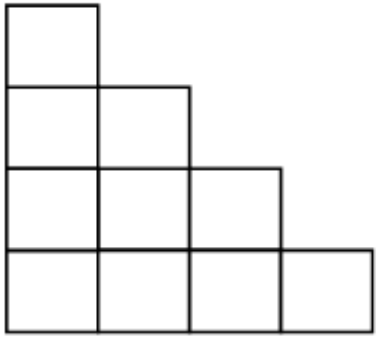


Figure 4

How can I make a general rule for the stair-like structure problem?

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Number Transformer Challenge #7

How does the number change inside of the box?

youcubed

Number Transformer Challenge #7

How does the number change inside of the box?

youcubed

Number Transformer Challenge #7

How does the number change inside of the box?

youcubed

Number Transformer Challenge #7

How does the number change inside of the box?

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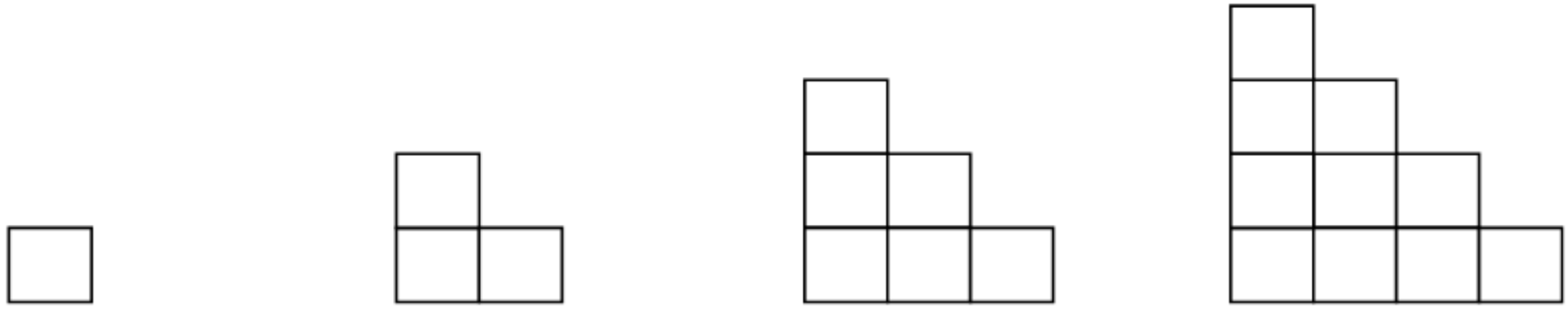
Homework: Stair-like Structure Problem



f) If you have 1,478 squares, can you make a stair-like structure using all of the squares?

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Math 8 Function Unit
Day 8

youcubed

Quick Write

On the ***next page*** in your **composition book**, write the GQ and LG. Then write your ideas about the GQ and LG.

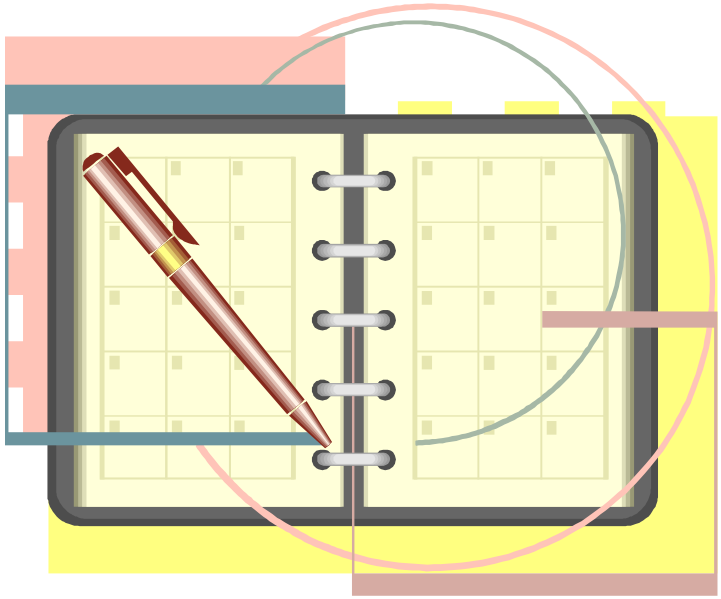
GQ: Why do we want to find a general rule for a pattern?

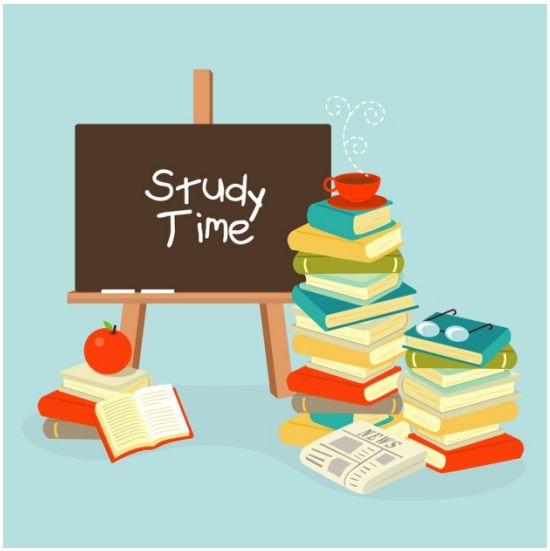
LG: I can ask clarifying questions.

youcubed

Record Tonight's Homework

Day 8 Homework Worksheet





youcubed

Guiding Question

Why do we want to find a general rule for a pattern?

Language Goal

I can ask clarifying questions.

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Debrief Homework: Stair-like Structure Problem

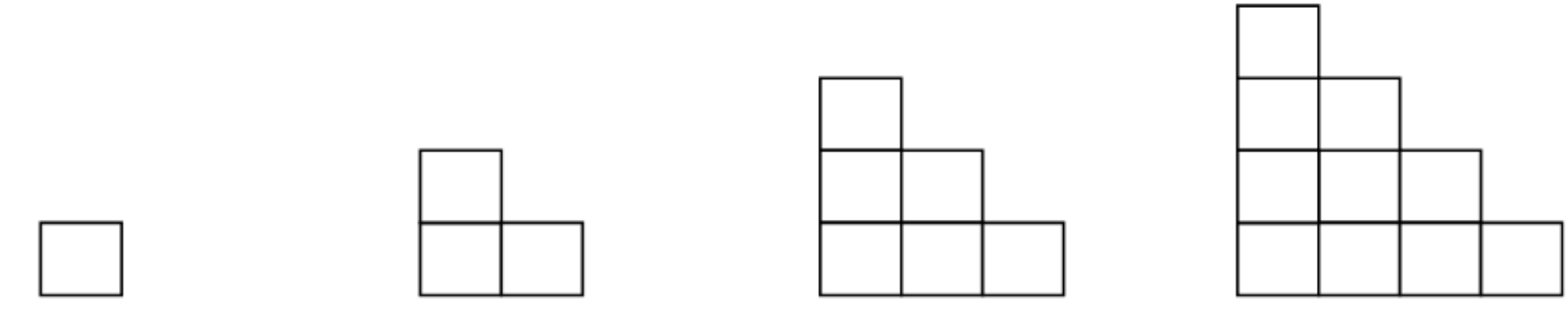

Figure 1 Figure 2 Figure 3 Figure 4

f) If you have 1,478 squares, can you make a stair-like structure using all of the squares?

youcubed

Number Transformer Challenge #8

How does the number change inside of the box?

youcubed

Number Transformer Challenge #8

How does the number change inside of the box?

youcubed

Number Transformer Challenge #8

How does the number change inside of the box?

youcubed

Number Transformer Challenge #8

How does the number change inside of the box?

youcubed

The Table Challenge Problem

Directions:

The table represents clues from the Number Transformer Challenge. The original number is called the input and the resulting number is called the output.

Your challenge is to work collaboratively with your group members to fill in the missing inputs or outputs. Then, answer the follow-up questions below.

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Math 8 Function Unit
Day 9

youcubed

Quick Write

On the ***next page*** in your **composition book**, write the GQ and LG. Then write your ideas about the GQ and LG.

GQ: What connection can you make between the input-output table and the Number Transformer Challenge?

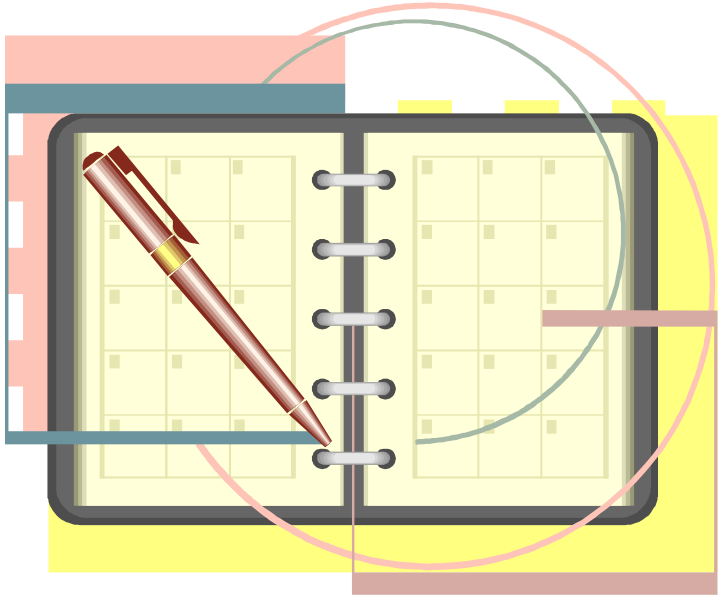
LG: I can explain what a relation and function is.

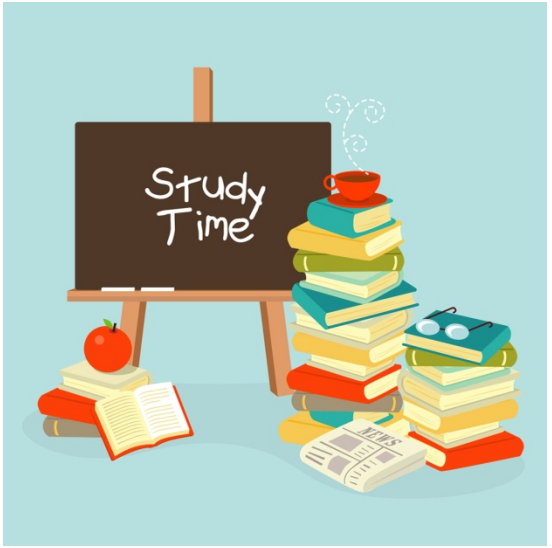
youcubed

Record Tonight's Homework

Day 9 Homework Worksheet

Unit Quiz Tomorrow





youcubed

Debrief Day 8 Homework

*Share your ideas in your group for 5 minutes.

*Be prepared to present your ideas to the class.

youcubed

Guiding Question

What connection can you make between the input-output table and the Number Transformer Challenge?

Language Goal

I can explain what a relation and a function is.

youcubed

Day 9 Problem Part 1

Input (x)	-3	-2	-1	0	1	2	3	4
Output (y)	-12	-8	-4	0	4	8	12	16

Does this input-output table represent numbers that have gone through a Number Transformer Machine?
Why or why not?

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Day 9 Problem Part 2

Input (x)	-3	-2	-1	0	1	2	2	3
Output (y)	-2	-1	0	1	2	3	4	5

Does this input-output table represent numbers that have gone through a Number Transformer Machine?
Why or why not?

youcubed

What is a relation?

*Definition: a relation is a set of inputs and outputs (or x and y values)

*Examples:

Input (x)	-1	0	1	2
Output (y)	2	0	-2	-4

Input (x)	-1	0	1	1
Output (y)	57	-0.5	100	23

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What is a function?

*Definition: a function is a special type of relation in which every input has exactly one output

*Example:

Input (x)	-1	0	1	2
Output (y)	2	3	4	5

*Non-example:

Input (x)	-1	0	1	1
Output (y)	-3	0	3	6

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Math 8 Function Unit
Day 10

youcubed

Quick Write

On the ***next page*** in your **composition book**, write the GQ and LG. Then write your ideas about the GQ and LG.

GQ: How can I determine if an Input-Output table represents a function?

LG: I can ask clarifying questions.

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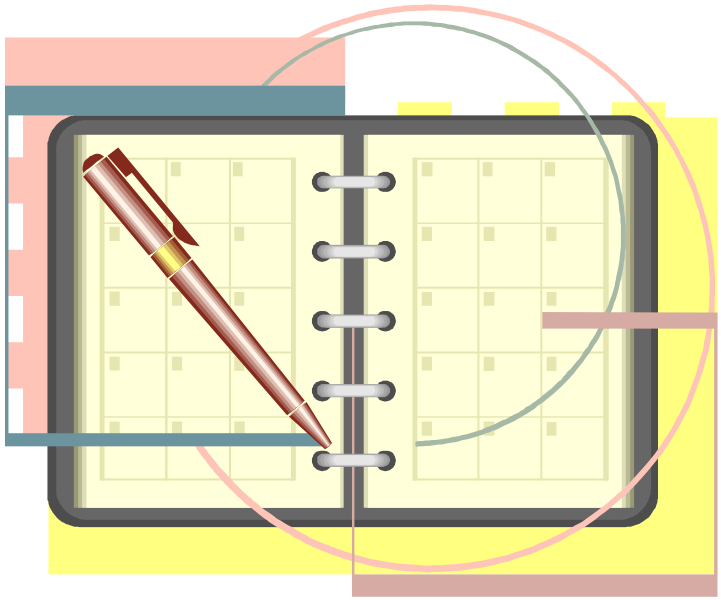
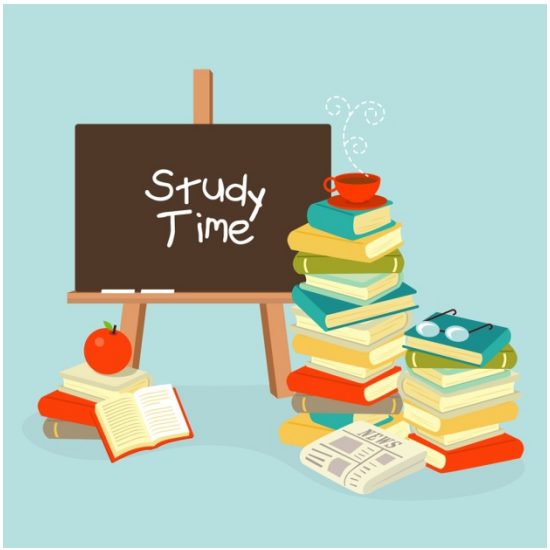
Record Tonight's Homework

Part 1: # 10





youcubed

Debrief Homework: Day 9 Worksheet

*Share your ideas in your group for 5 minutes.

*Please ask questions and compare your answers.

youcubed

Guiding Question

How can I determine if an input-output table represents a function?

Language Goal

I can ask clarifying questions.

youcubed

Functions Unit Quiz #1

To complete your assessment successfully, be sure to **show all your work** and **explain your thinking.**

youcubed

Math 8 Function Unit
Day 11

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Quick Write

On the ***next page*** in your **composition book**, write the GQ and LG. Then write your ideas about the GQ and LG.

GQ: How are the input-output tables, equations, and the number transformer challenges related?

LG: I can ask clarifying questions.

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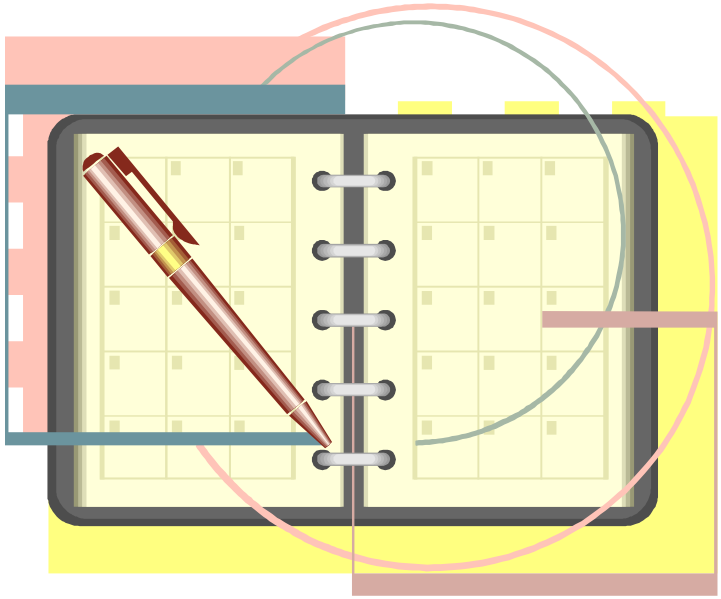
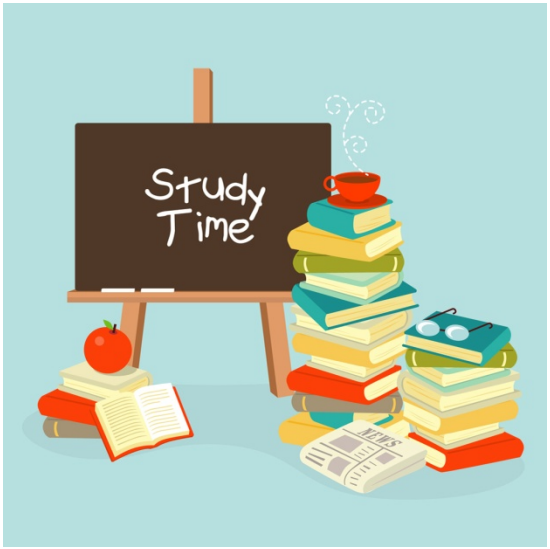
Record Tonight's Homework

Part 1: #7 (*functions*),
#8 *(input-output table, general rule/equation)*





youcubed

Debrief Homework

*Share your ideas in your group for 5 minutes.

*Be prepared to present your ideas to the class.

youcubed

Guiding Question

How are the input-output tables, equations, and the number transformer challenges related?

Language Goal

I can ask clarifying questions.

youcubed

Day 11 Function Sort

Question: Which of the following represent the same relation?

Directions:

1) Cut out the various pieces.
2) Work with your group members to match up the various representations.
3) Be ready to present how and why you grouped the pieces the way you did.

youcubed

Day 11: Error Analysis Problem

Directions:

1) Individually work on the Error Analysis Task. Explain if you agree or disagree with the student below each problem.
2) Discuss your decision with your group members and try to come to an agreement.
3) Present your ideas to the class.

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Math 8 Function Unit
Day 12

youcubed

Quick Write

On the ***next page*** in your **composition book**, write the GQ and LG. Then write your ideas about the GQ and LG.

GQ: How can you represent a pattern in an input-output table?

LG: I can ask clarifying questions.

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Debrief Homework

*Share your ideas in your group for 5 minutes.

*Be prepared to present your ideas to the class.

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Guiding Question

How can you represent a pattern in an input-output table?

Language Goal

I can ask clarifying questions.

youcubed

Day 12 Mega Sort

Question: Which of the following represent the same function?

Directions:

1) Cut out the various representations.
2) Work with your group members to match up the various representations.
3) Be ready to show and justify your ideas and strategies to the class.

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Math 8 Function Unit
Day 13

youcubed

Quick Write

On the ***next page*** in your **composition book**, write the GQ and LG. Then write your ideas about the GQ and LG.

GQ: What are the important features of a graph?

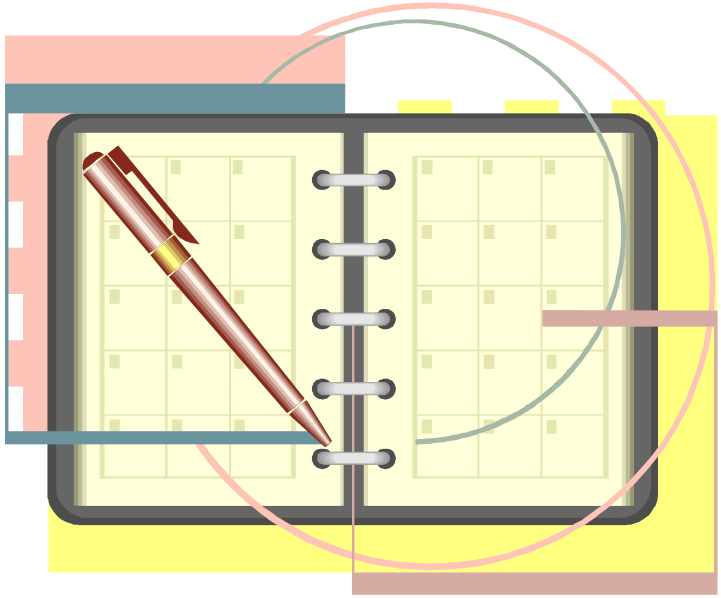
LG: I can write a story to describe a graph.

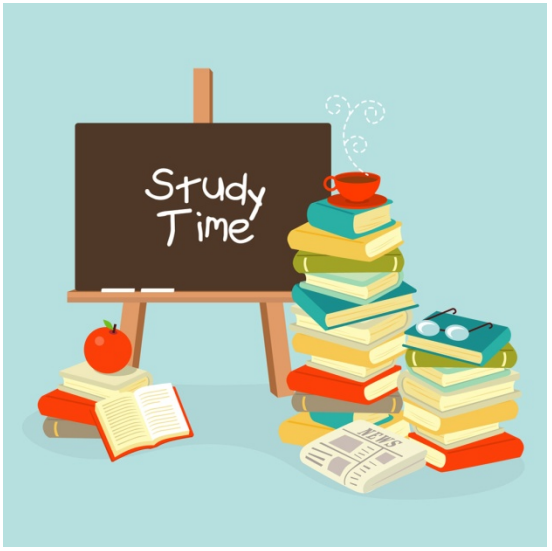
youcubed

Record Tonight's Homework

Day 13 Homework Worksheet

Study for the Functions Unit Test





youcubed

Guiding Question

What are the important features of a graph?

Language Goal

I can write a story to describe a graph.

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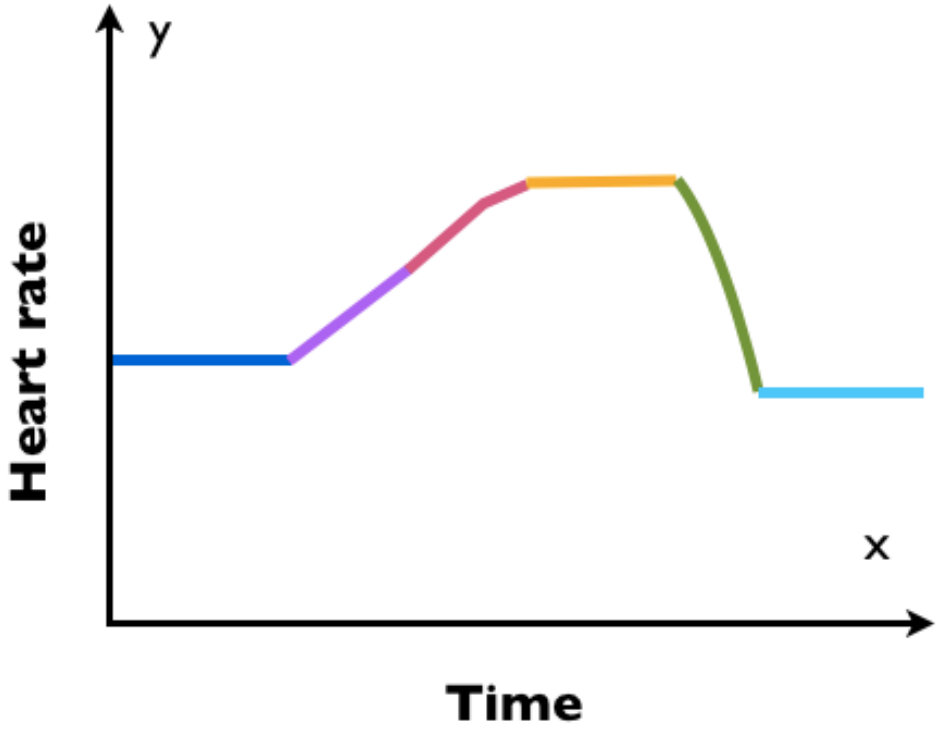
Day 13 Problem Part 1: Analyze the Graph

Directions: Write a story to match the graph.



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Day 13 Problem Part 2: Create a Graph

Directions: Create a graph for the situation below. Label the x and y axis.

In San Diego, the air temperature was constant for several hours in the morning. Then the temperature rose steadily for several hours. It stayed the same temperature for most of the day before dropping sharply after sunset.

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Math 8 Function Unit
Day 14

youcubed

Quick Write

On the ***next page*** in your **composition book**, write the GQ and LG. Then write your ideas about the GQ and LG.

GQ: What are different ways that I can represent a function?

LG: I can ask clarifying questions.

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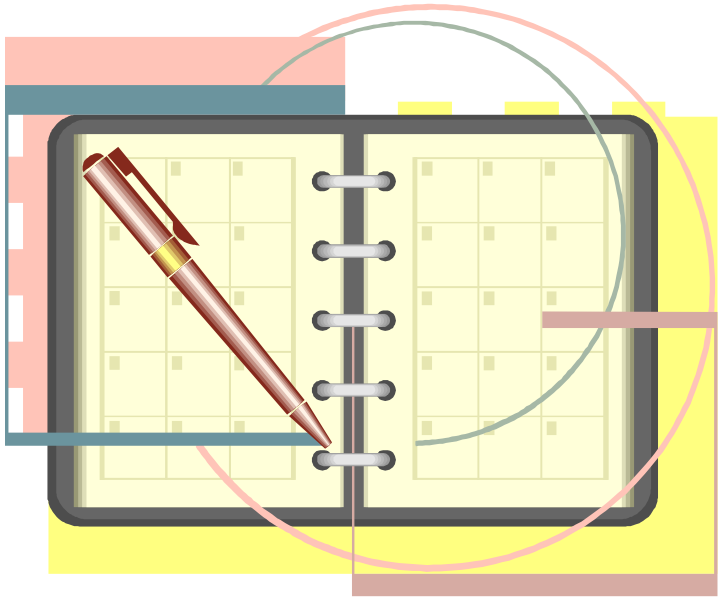
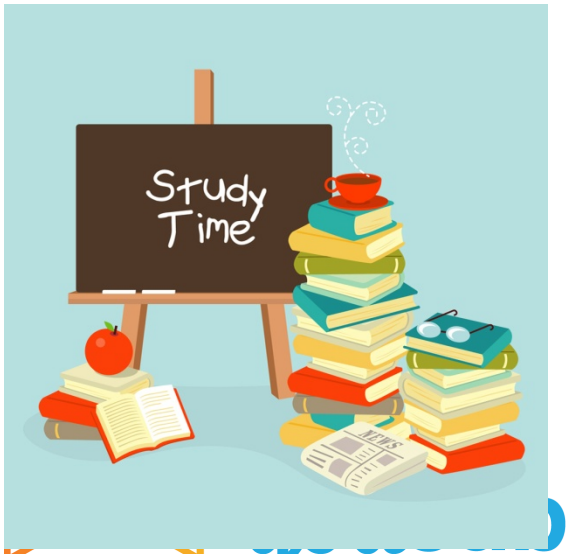
Record Tonight's Homework

Function Unit Review Sheet

Study for the Function Unit Test Tomorrow!





Guiding Question

What are different ways that I can represent a function?

Language Goal

I can ask clarifying questions.

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Day 14 Problem Part 1 & 2

Directions:

1) Work individually for 5 minutes to analyze how the pattern grows/changes.
2) Work collaboratively with your group members to answer the other questions.
3) Be ready to present and justify your ideas to the class.

*When your group finishes Part 1, please ask the teacher for your Accountability Quiz.

youcubed

Math 8 Function Unit
Day 15

youcubed

Quick Write

On the ***next page*** in your **composition book**, write the GQ and LG. Then write your ideas about the GQ and LG.

GQ: Why do mathematicians look for and generalize patterns?

LG: I can explain my ideas in words.

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Homework Questions & Answers

*Share your questions and ideas about the Function Unit Review Sheet in your group for 5-10 minutes. Make sure you understand how to answer each question.

*The teacher will review all questions using the Function Unit Review Sheet Answer Key for 5-10 minutes.

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Guiding Question

Why do mathematicians look for and generalize patterns?

Language Goal

I can explain my ideas in words.

youcubed

Function Unit Assessment

To complete your assessment successfully, be sure to **show all your work** and **explain your thinking.**

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