CAMPBELL RIVER

School District 72

NUMERACY RESOURCES SAMPLER

INTERMEDIATE ELEMENTARY (3-5)

- Instructional Resources (for Teacher Use)
- Games & Puzzles (for Student Use)
- Assessment and Reflection Resources

NUMERACY RESOURCES SAMPLER

INTERMEDIATE ELEMENTARY (3-5)

Instructional Resources (for Teacher Use)

Masters, Games & Puzzles (for Student Use)

Assessment and Reflection Resources

Numeracy Development Continuum

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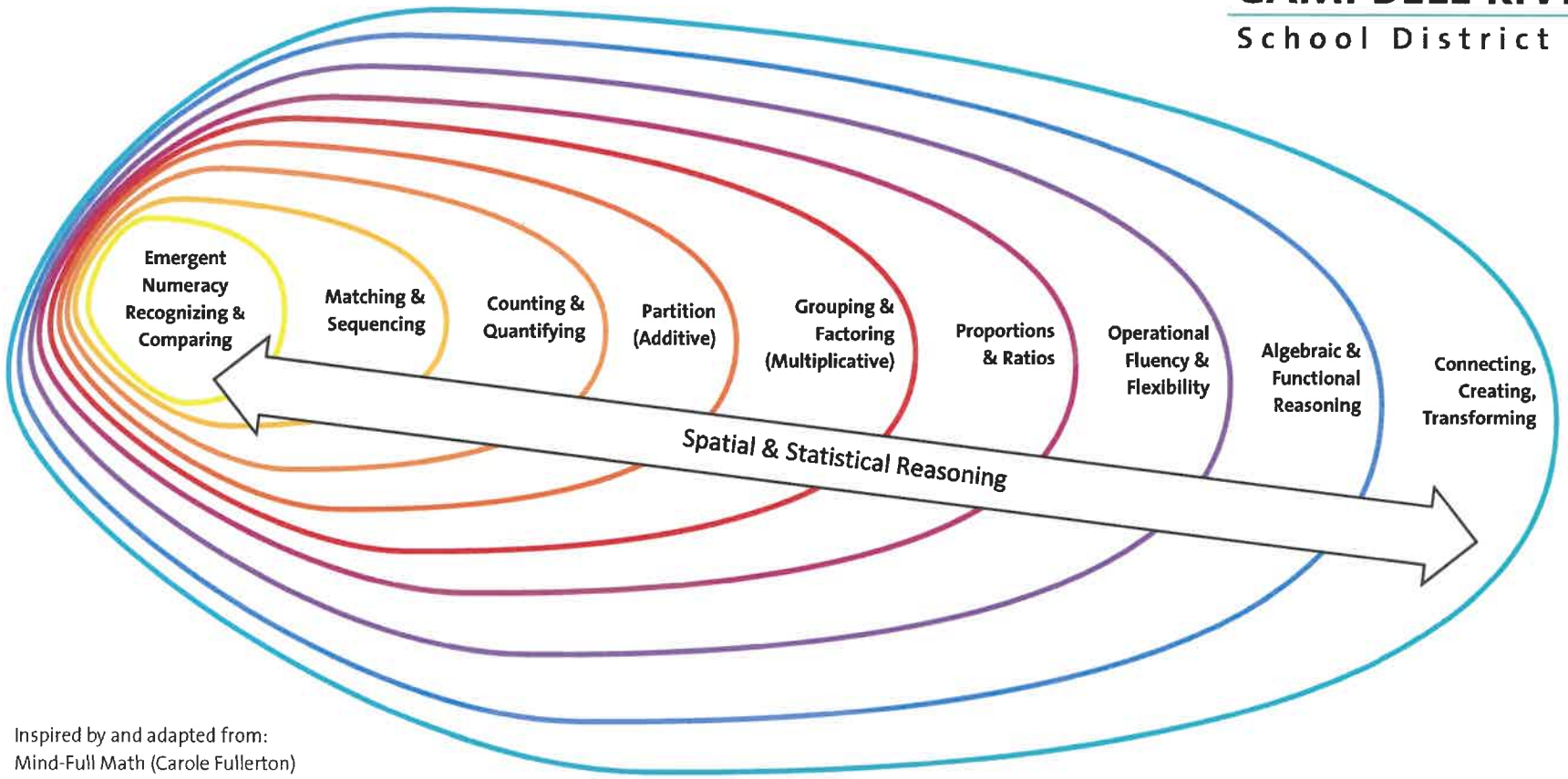

Inspired by and adapted from:
Mind-Full Math (Carole Fullerton)
Roadmap to Proportional Relationships (Jon Orr)
Mathematical Learning Landscapes (Cathy Fosnot)
Development of Mathematical Reasoning (Pam Harris)
Student Continuum of Numeracy Development (Alex Lawson)
Teaching Elementary & Middle School Mathematics Developmentally (Van de Wall)

Development of Mathematical Reasoning

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Math in Context

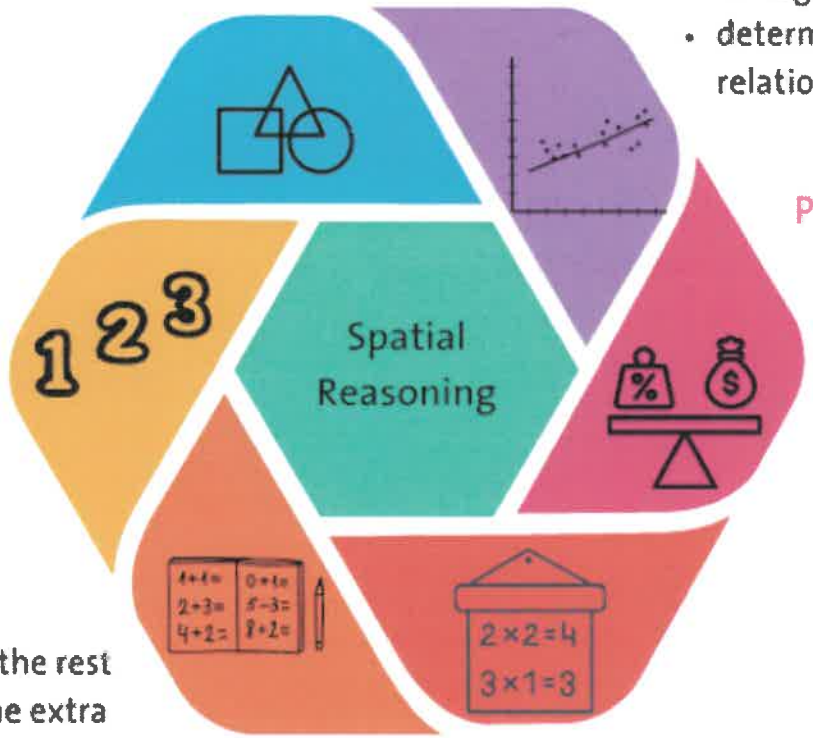
Authentic connection, rooted in place, community use, and identity

Algebraic Reasoning

- symbolic logic (words, #s & symbols)
- breaking a process into logical steps

Functional Reasoning

- determine an input/output rule
- determine a logical range of values
- consider the effect of scale factor (rate of change) on a relationship
- consider the initial value or constant for a given relationship
- determine overall trend of a relationship



Counting Strategies

- counting from 1
- counting on by 1
- counting using 1:1 equivalence (fingers, etc.)
- counting groups by counting on
- removing or distributing items 1 at a time

Proportional Reasoning

- solve proportional problems using multiplication, division, and other logical strategies
- scale up from a base ratio
- use a ratio table
- combine additive and multiplicative reasoning to create equivalent ratios

Additive Thinking

- add up to a group of 10, then add the rest
- round up and add, then remove the extra
- subtract to a group of 10, then subtract more
- round up, subtract more, then add back the extra
- skip counting
- repeated subtraction

Multiplicative Thinking

- use known multiples as benchmarks
- multiply by the next group of ten, then remove groups
- use known multiplication facts to make division statements
- multiplication & division by place value

Inspired by Pam Harris' *Development of Mathematical Reasoning*

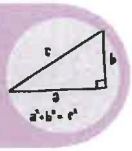
10 STRATEGIES TO estimate reasonably

01. Take aim

Use a referent or benchmark value and try it. Revise to get closer to the target.

02. Sketch It

Draw a picture that is detailed and informative



03. Compare

Compare the problem to others you have seen

04. Connect

Connect the problem to a known proportion, formula, or rule

05. Overall Shape

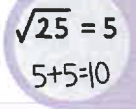
Refer to the container for clues (shape, dimensions, etc.)

06. Break it into Chunks

Break the problem down step by step

07. Tidy up

Format answers so that they are clean, clear, and easy to read

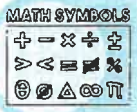


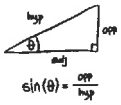
08. Organize it

Make a table or list to keep your ideas organized

09. Encode it

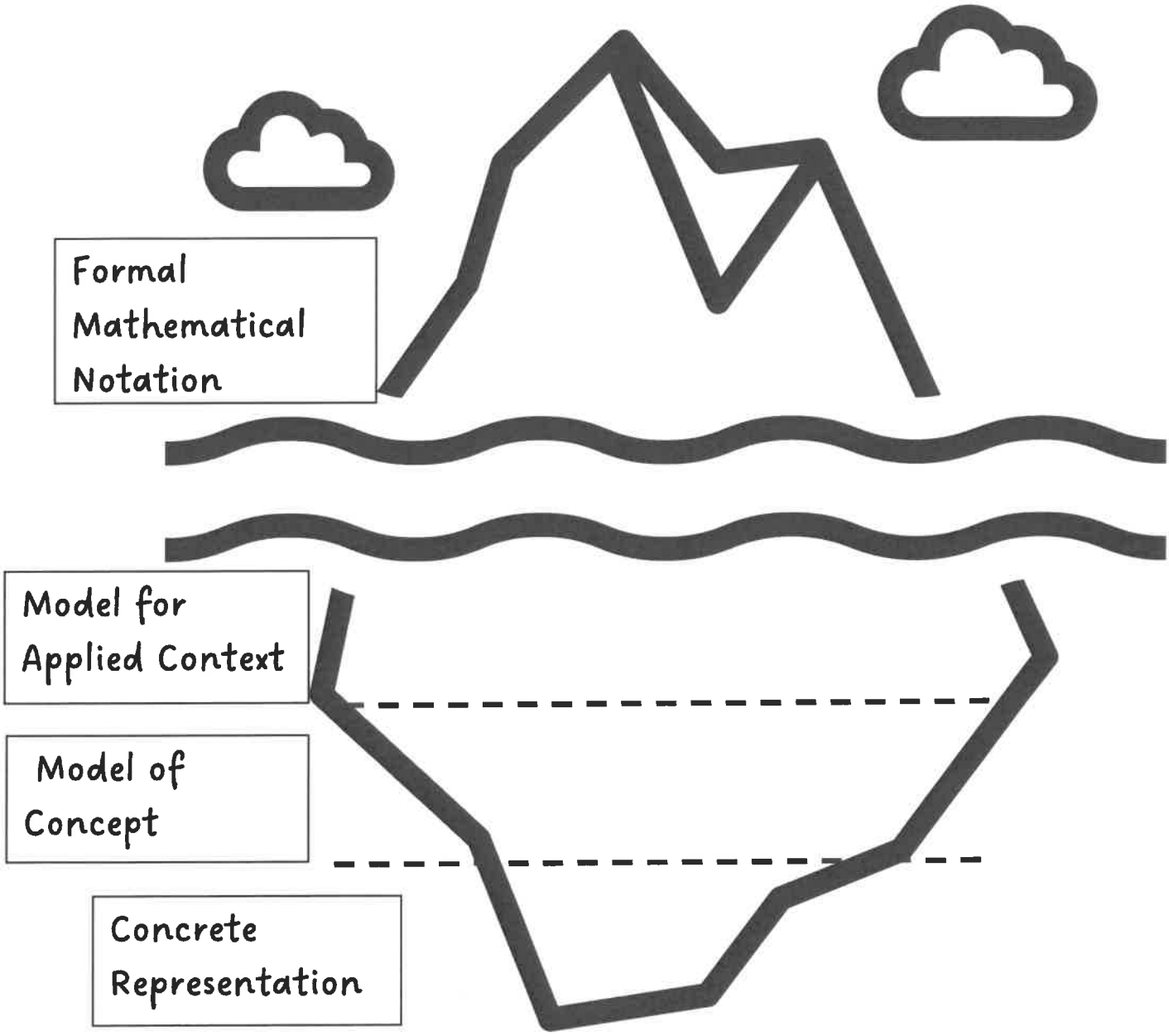
Use symbols and shorthand to represent ideas efficiently





10. Substitute

Make substitutions to combine or simplify elements


Formal
Mathematical
Notation
Model for
Applied Context
Model of
Concept
Concrete
Representation

10 Questions to Guide Game Selection

To what extent does the game...

1. Provide an opportunity to practice the subset of facts that the students are learning?

2. Appeal to the age of your students?

3. Employ visuals or tools (such as ten frames, quick looks, or arrays) to support strategy development?

4. Involve selecting from among derived fact strategies (for mastery-level games)?

5. Provide opportunities for discussion among students about their mathematical thinking?

6. Encourage individual accountability? (For example, are students solving their own facts or competing to solve the same fact? The former practice provides more "think time" and avoids opting out.)

7. Remove time pressures?

8. Involve logic or strategic moves, enhancing the "fun factor"?

9. Offer opportunities for adaptation so that all students can experience appropriate challenge?

10. Lend itself to you being able to listen and watch in order to assess progress?

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Power Up Math Daily Routine (created by Rod Beavis)

This is a math routine I use almost daily to help keep concepts fresh in the minds of students throughout the year. It is only 5 questions and gives me a quick snapshot of how they are doing. For grade 4/5, the questions aim to reinforce operational fluency.

Students do their work on their personal white boards and then write their answers in a notebook. The whole routine can usually be done within 15 minutes and does not take very much prep time. I have never had a class that does not love this routine. Usually, they protest if we have a day where we don't do Power Up.

Here's an example of two question sets:

Power Up 3	Power Up 4
1.) 973 + 597 =	1.) 9734 + 5978 =
2.) 800 – 257 =	2.) 8000 – 2576 =
3.) 39 x 6 =	3.) 928 x 7 =
4.) 75 ÷ 6 =	4.) 758 ÷ 6 =
5.)  What time is shown on the clock?	5.)  What time is shown on the clock?

The focus of the questions can easily change, and it gives us an opportunity to review concepts previously covered as well as practice new learning.

Math Questions to Promote Thinking

Why do you think that?

What were you thinking here?

Can you paraphrase their thinking? Can anyone?

How do you know this is right? Is it right? Are you sure? What makes you so sure?

Can you find a time or place where this won't work?

Did anyone get the same answer in a different way?

Did anyone get a different answer? How did you get your answer?

What do you think helped you decide how to get your answer?

Tell us what you were thinking.

What would happen if...

Is there a pattern? What is it? Why not?

What decisions can you make from this pattern?

What is the same, or different, about your two ways of doing this?

What do you think will happen next? How do you know? Are you Sure?

Can you prove it?

Can you change something to make it come out differently? What? Why do you think that works?

Will it be the same if we use different numbers? Why or why not?

Does it make sense to you? Why or why not?

What would seem more reasonable? Why?

How can you check it to see for yourself?

What do you think that you should do next? Why?

Can you make a model or drawing to show what it means?

Find someone and see if you can work it out together. Explain it to them.

Will what you did always work that way? What makes you think that?

Do you see a pattern? What is it? How could you make it easier to see?

How could you have done this more quickly?

What other numbers would work?

Are there some numbers for which that will not work? How do you know?

Write a new problem that is different in some ways but the same in others.

What is the largest number that will work? The smallest?

Do you want to change your answer? Why do you want to change your answer?

How does this relate to...?

Have you seen a problem like this before?

Tell or write a story that uses this kind of mathematics?

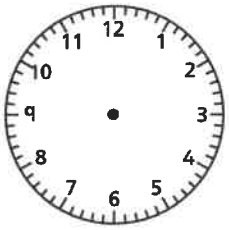
What would you measure it with? Why?

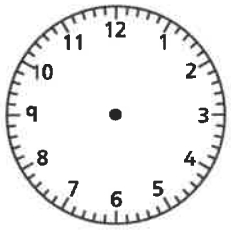
How do you think a carpenter (or other profession) would use this?

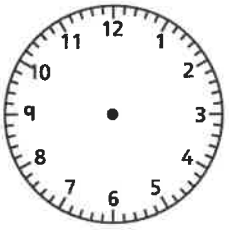
Use these materials to show me how you solved this problem. Do you think other materials would work better?

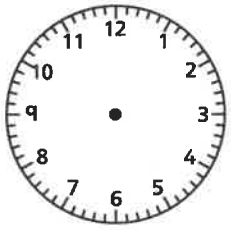
Time of day

Draw four things you did today, one in each box.
Make the clock show the time you did each thing.









Name:

Date:

I can...

mild	medium
volcano	spicy

BIG 4 TEMPLATE

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Problem Solving Strategies

Understanding / Tackling the problem

- [ ] Re-read a question more slowly if it doesn't make sense the first time
- [ ] Highlight or underline important pieces of information
- [ ] Break the problem down into smaller parts
- [ ] Refer to a similar example that you have seen before
- [ ] Ask for help

Represent/Visualize

- [ ] Build or draw a model
- [ ] Draw a tally chart
- [ ] Draw a graph

Use a Pattern

- [ ] Create a table
- [ ] List elements in the table
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Work Backwards/Forwards/Inwards

- [ ] Use logic to fill in gaps in knowledge
- [ ] Include algebra to show reasoning

Strategic Guessing and Revision

- [ ] Identify logical minimum and maximum
- [ ] Write an equation or rule, test the rule with at least 2 values
- [ ] Use substitution to test strategic guesses

Verify a Solution

- [ ] Use a different method - do you end up at the same result?
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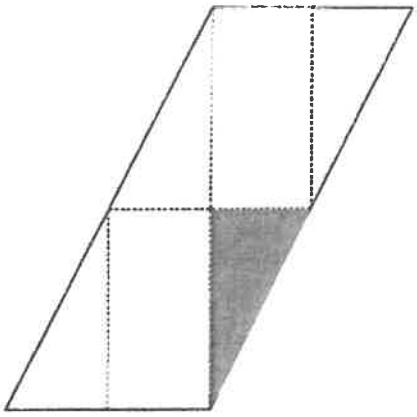
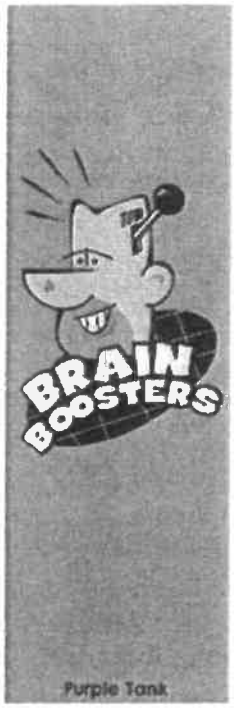
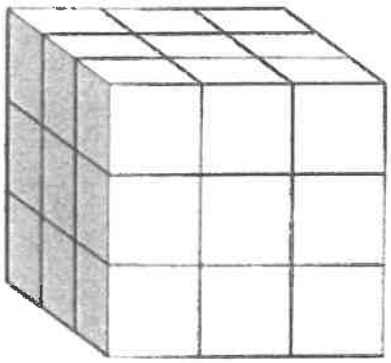
Self Assessment : 1: Rarely | 2: Occasionally | 3: Often or Usually | 4: Consistently, Exemplary Skill Shown



The area of the shaded triangle is 6 sq cm.
What is the area of the whole shape?





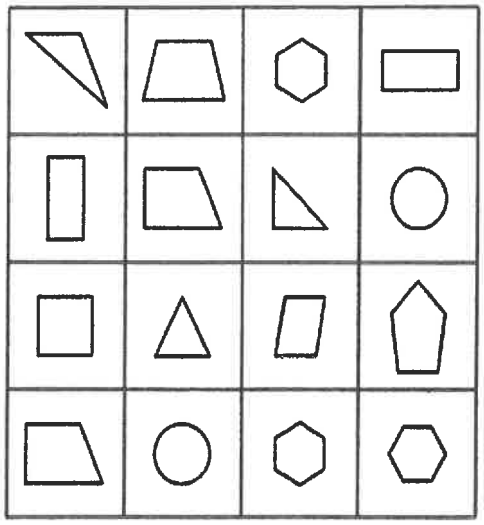
Examples of problems for the ThinkTank resource @ the EdLent

MAKT 0357,58,59 . . .

If you made this building, how many  would be hidden inside?

Clues

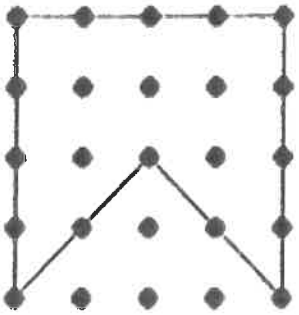
- It is in a row of all polygons.
- It is in a column of all polygons.
- It has a least one right angle.



3

 = 1 square unit

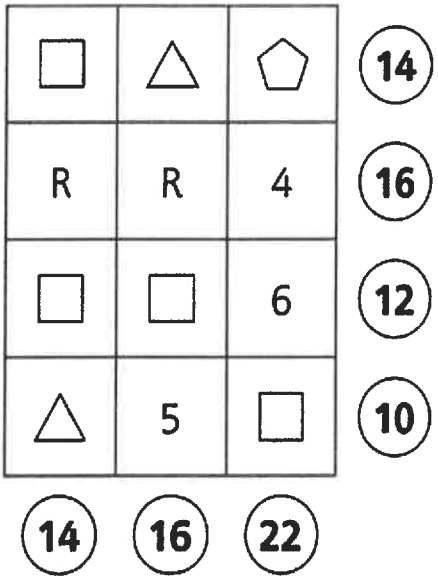
 = $\frac{1}{2}$ square unit



What is the area of the pentagon in square units?

The numbers in the circles are the sums of the rows and the columns.

Same shapes and letters are the same numbers.



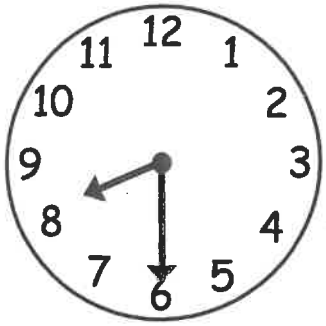
a. △ = ____

b. □ = ____

c. ⬠ = ____

d. R = ____

Time Cards



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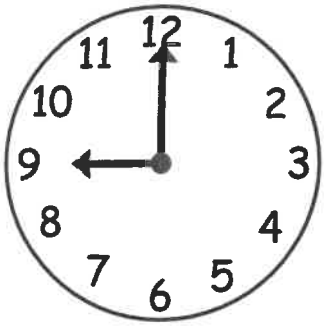

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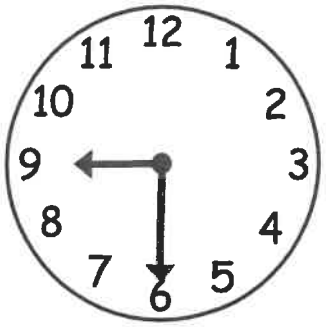

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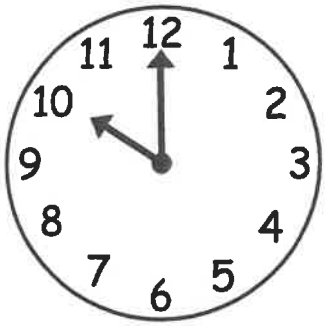

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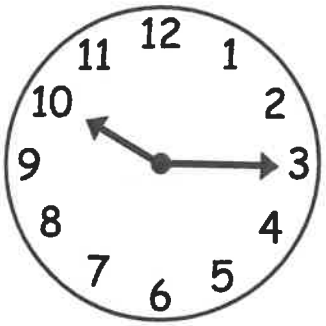

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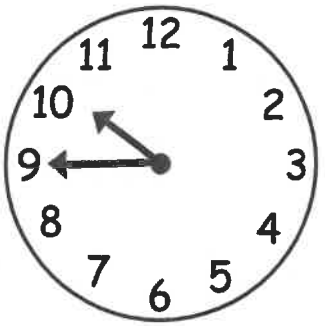

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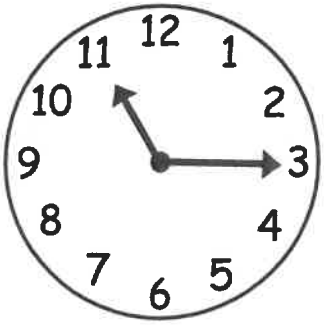

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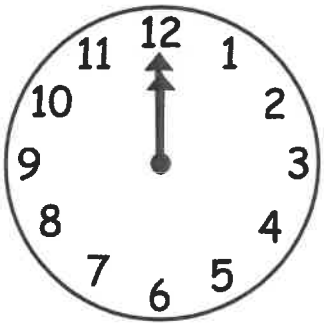

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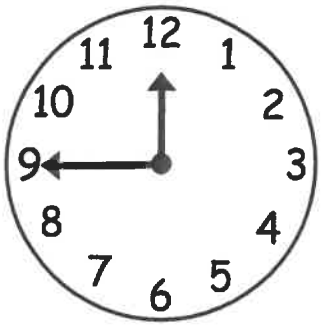

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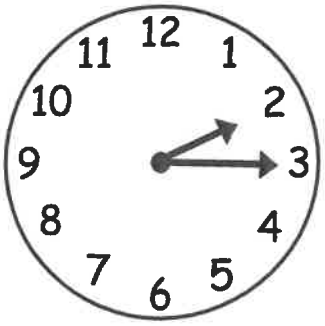

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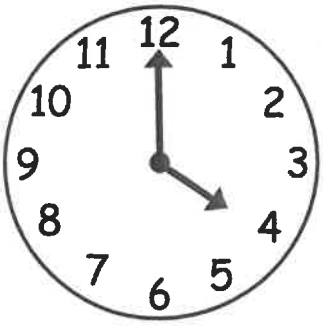

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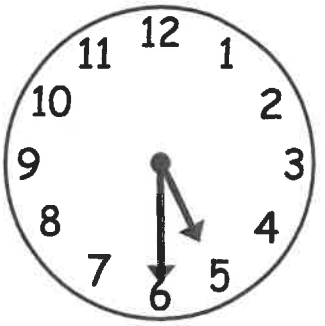

5:30

Time Cards

 Alarm Clock	 Alarm Clock	 Alarm Clock
 Alarm Clock	 Alarm Clock	 Alarm Clock
 Alarm Clock	 Alarm Clock	 Alarm Clock
 Alarm Clock	 Alarm Clock	 Alarm Clock

Numeracy Thinking Paper Name: _____

(Story Problems and Problem of the Week)

What do you know? What details are given in the story or problem description? (ex. Use numbers, words, and/or pictures)	What strategies will you use to organize the information you know AND the information you can figure out? ☐ make a list ☐ make a table ☐ use symbols or shapes ☐ make a visual model
What operations or steps did you do? Write numbers and signs to show the steps you used. ① ② ③	What is your final answer? (In words) How did you check if you were right? ☐ work backwards ☐ try a different strategy and get the same answer ☐ check with a peer ☐ use an answer key ☐ _____

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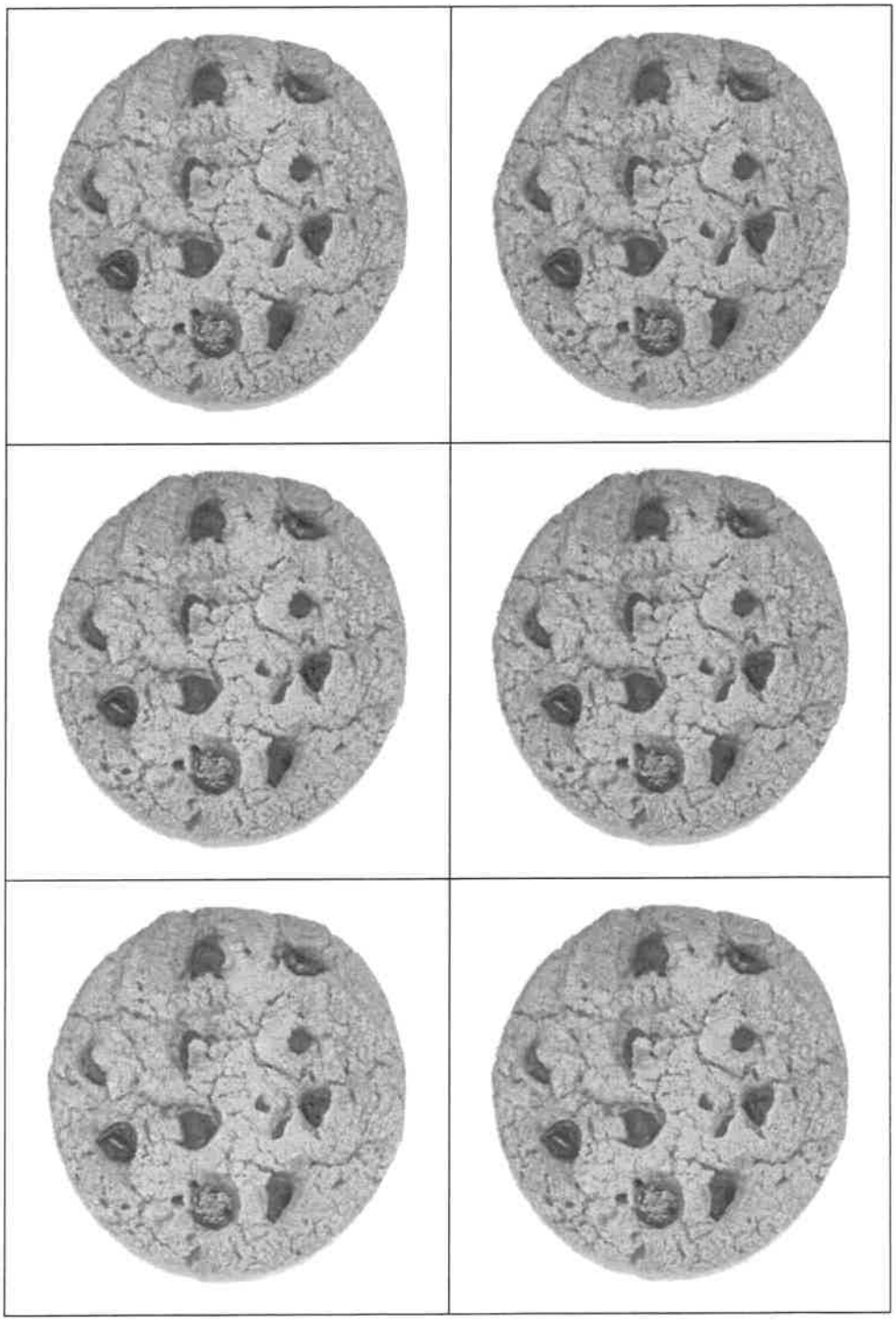
Self Assessment : 1: Rarely | 2: Occasionally| 3: Often or Usually| 4: Consistently, Exemplary Skill Shown

SHARING COOKIES

Katarina, Jordan, and yourself get to share 6 cookies. But Katarina's mom says that she is only allowed to have one cookie. How will you share the cookies?



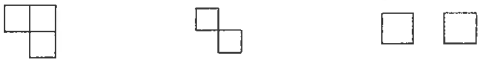
BUILDING A GARDEN

Your class is going to build a garden to grow plants to sell. The garden will be made up of planter boxes and paving stones to walk on. The garden must be wheel chair accessible so the paving stones are wide enough for wheel chairs. In order for the garden to grow well it must be weeded and watered regularly. To make sure that you can do this there are a few design rules to follow:

1. You must be able to walk beside each planter box on at least one side. This way you can take care of the plants in that box.

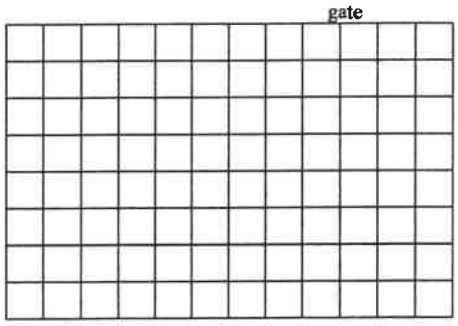
2. You are not allowed to step over any planter boxes. This is bad for the plants.

3. Paving stones must be connected along at least one side so that the path is wide enough for wheel chairs.



4. There must be a fence around the garden to keep animals out. The fence must have a gate. You can position the gate anywhere you want.

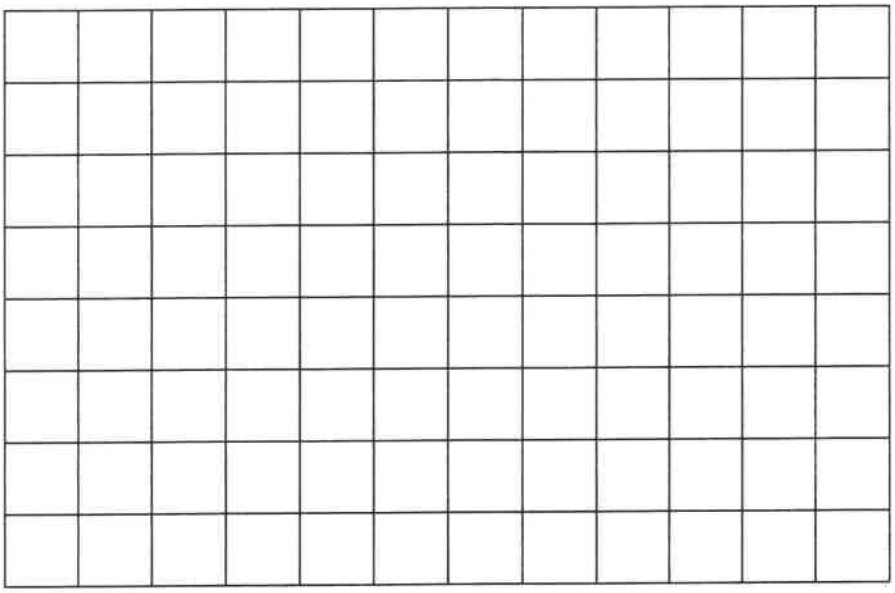
Last year's class designed the following garden with 46 planter boxes:

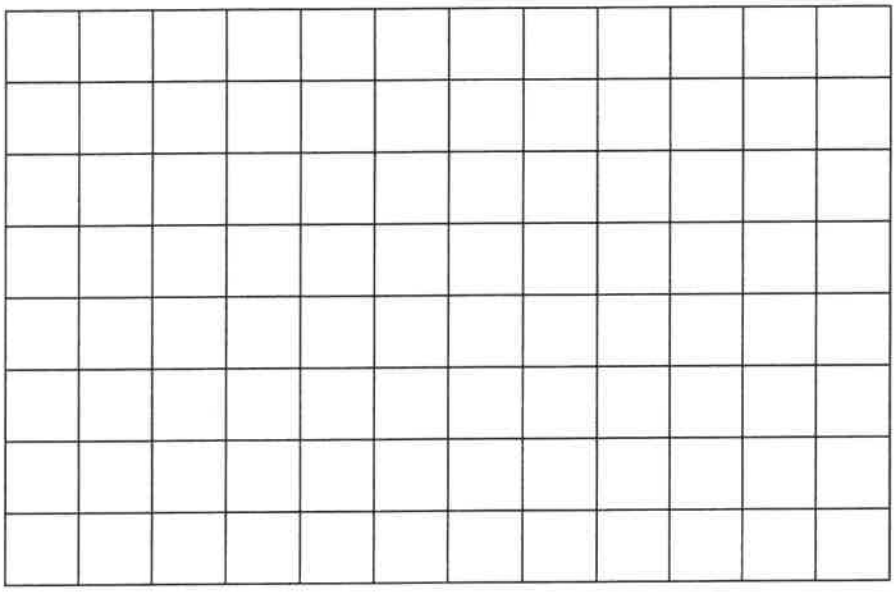


(shaded squares are planter boxes, white squares are paving stones.)

Your task is to design the best garden. When you have finished you must explain why your design is the best.

Building a Garden-work grids





Garden Beds Rich Task Name: _____

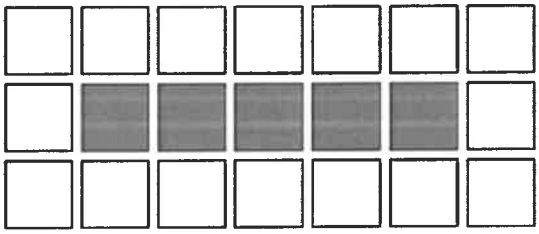
GARDEN BEDS

You Need

- About five [5] tiles to use as 'plants'
- About sixteen [16] tiles in a different colour to use as border tiles

The Story

A gardener places his plants like this:



The plants are in one [1] continuous line.

There could be any number in the line.

The border tiles always surround the plants.

Your Task

1. Work out the number of border tiles needed if the gardener had:
   ... one [1] plant ... two [2] plants ... five [5] plants ... ten [10] plants
2. Explain how to work out the number of border tiles needed for any number of plants, for example, one hundred [100] plants in a line.

Challenge

Find two more ways to explain how to work out the number of border tiles if you know the number of plants.

1. What if the plants are planted in an array (with more than one row)?
2. How does that change the way you need to calculate the number of tiles?
3. Is it possible to have the same number of plants as tiles?
4. Can you find an arrangement that encloses more plants than tiles?

Math Lab: **Are Rockets Candies Packaged Randomly?**

Name:_____ **Date:**_____

Hypothesis: **If** Rockets are packaged randomly,

then _____.

Independent variable: The Rocket colours/flavours that are possible in a packet

Controlled variable: The number of rockets in one packet

Dependent variable:_____

Materials / Equipment: 1 Packet Rockets candies

1 pencil/pen

4 - 6 pencil crayons or markers

1 ruler

1 Calculator (standard)

Procedure:

1. **Investigate**: How many colours are possible? how big is each packet?
2. **Collect Data**: How many of each colour does your packet contain?
3. **Consolidate Data**: Combine your data with **at least 3** other people's data.
4. **Represent Data**: Create graphs to model the grouped data visually (make a bar and a circle graph)

Required for All Graphs:

❑ A Descriptive Title	❑ Labels
❑ Correct Data	❑ Clear & Precise

5. **Analyze Data:** Describe the data in general and some details (min/max)

Required for Analysis:

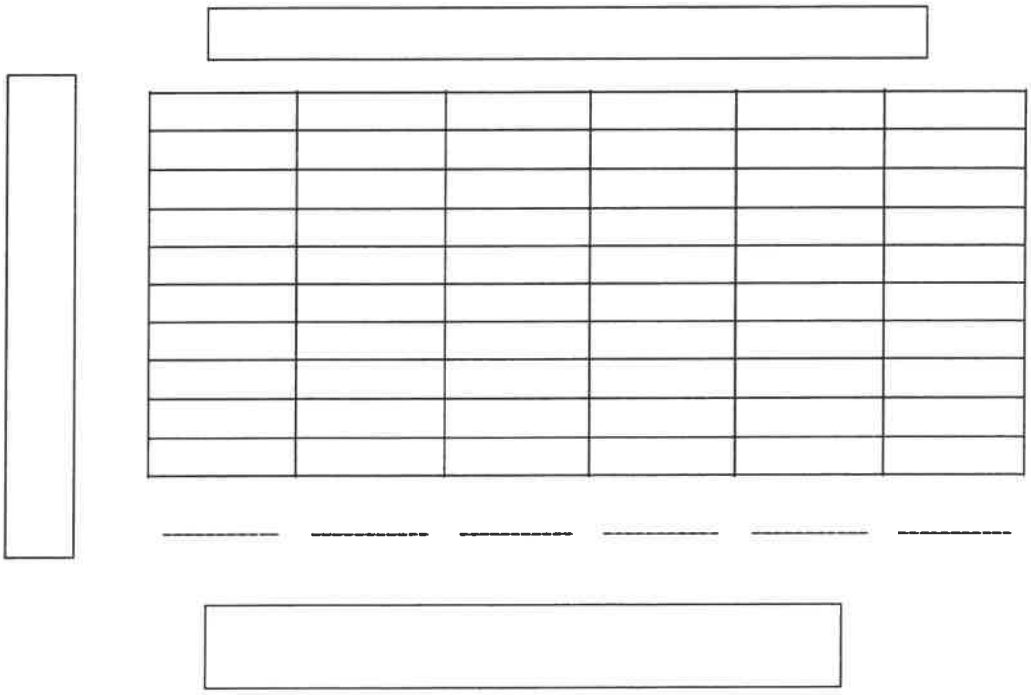
❑ Connection(s) to Results	❑ Numbers from Data
❑ Math Vocabulary & Notation (most, least, equal, %, etc.)	❑ Clear & Accurate Responses

Data Tables & Graphs

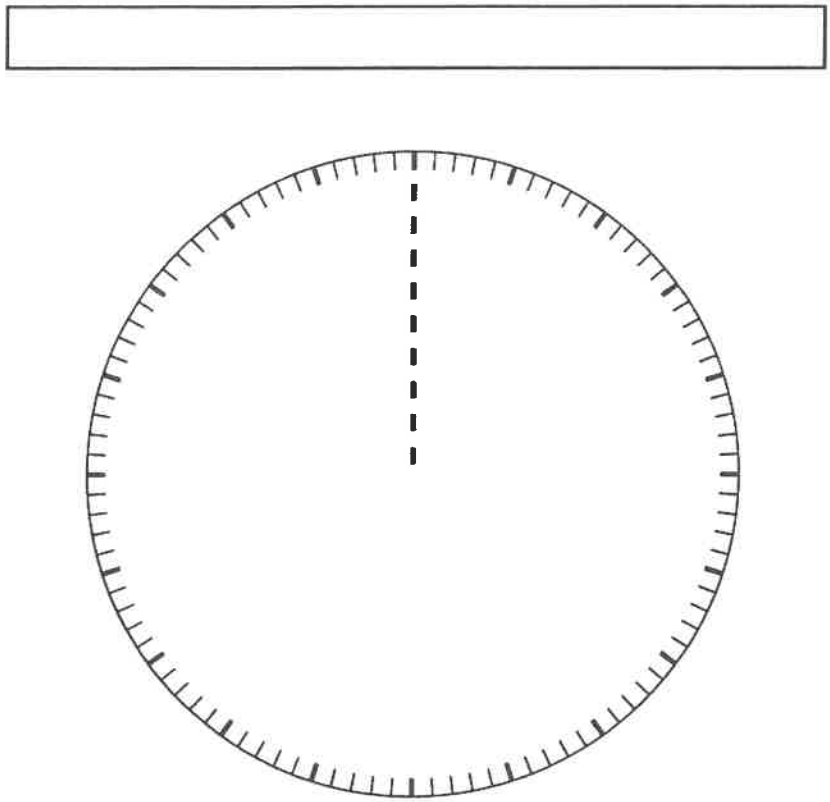
Data Table

Colour	Tally	Number (Frequency)	Percent (%)

Bar Graph



Circle Graph



Analysis:

1) **In general,**

2) **The maximum ...**

3) **The minimum ...**

Conclusion (Refer back to the hypothesis)

In conclusion, it appears that packets of rockets (are / are not) randomly produced,

because _____

Factors that may have influenced my results (or caused errors)

_____

_____

Implication/Connection to the experimental results

(Suggest a follow-up study, a related investigation you could do, or a set of data that would produce different results)

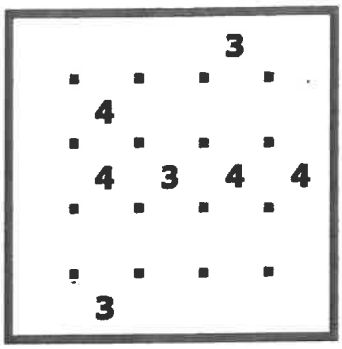
_____

_____

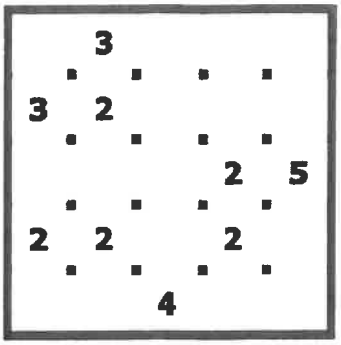
Curricular Competencies

Understanding (Data Collection)	
Solving (Calculate percentages from raw data)	
Reasoning & Analyzing (Hypothesis, Analysis, Conclusion)	
Communicating (Using Mathematical Vocabulary)	
Representing (Model Concrete Data in a table, a circle graph, and a bar graph)	
Connecting and Reflecting (Error analysis & implication/connection)	

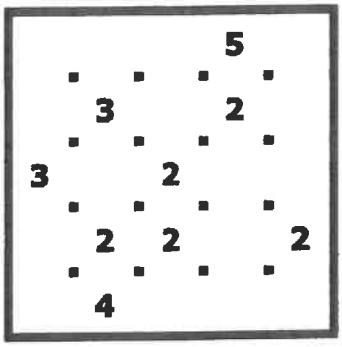
Mild



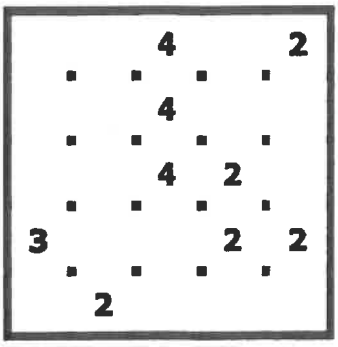
5x5 Shikaku Puzzle ID: 5,773,793



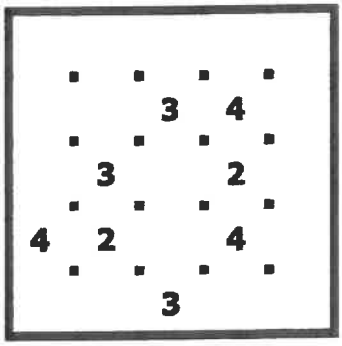
5x5 Shikaku Puzzle ID: 281,018



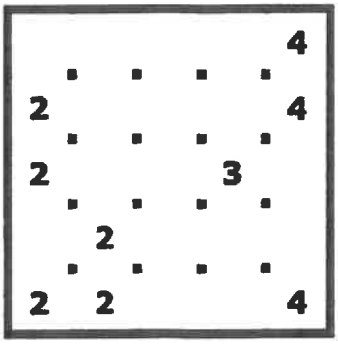
5x5 Shikaku Puzzle ID: 9,888,631



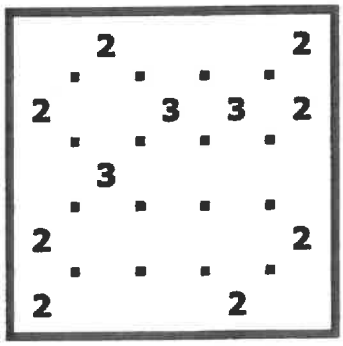
5x5 Shikaku Puzzle ID: 1,562,159



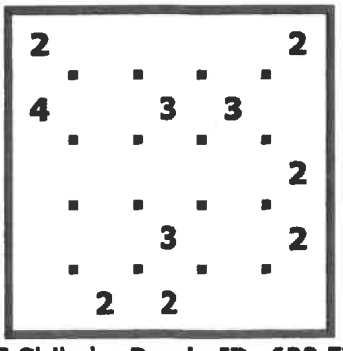
5x5 Shikaku Puzzle ID: 9,869,905



5x5 Shikaku Puzzle ID: 5,953,361



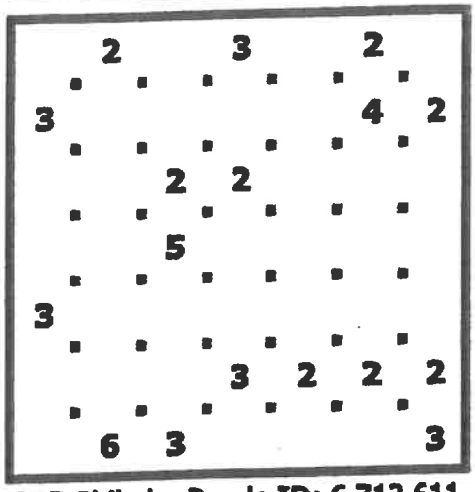
5x5 Shikaku Puzzle ID: 5,321,809



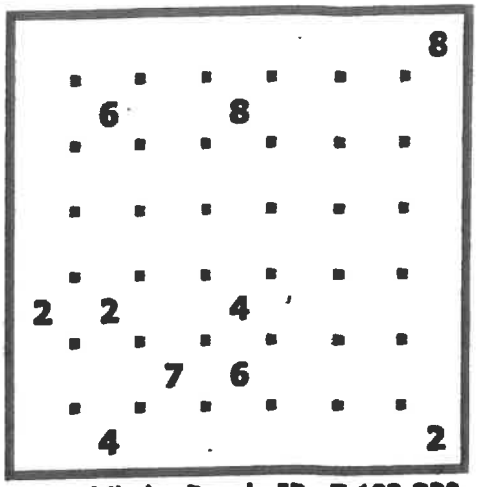
5x5 Shikaku Puzzle ID: 622,572

SHIKAKU

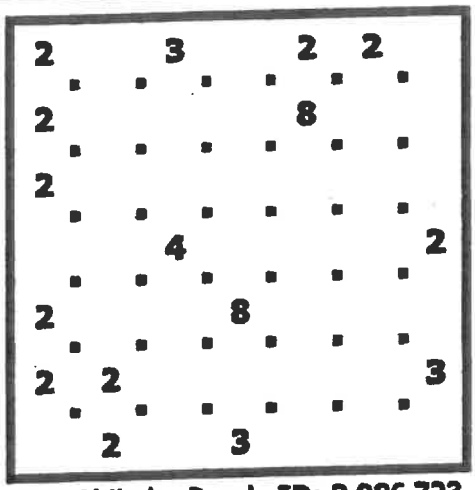
Medium



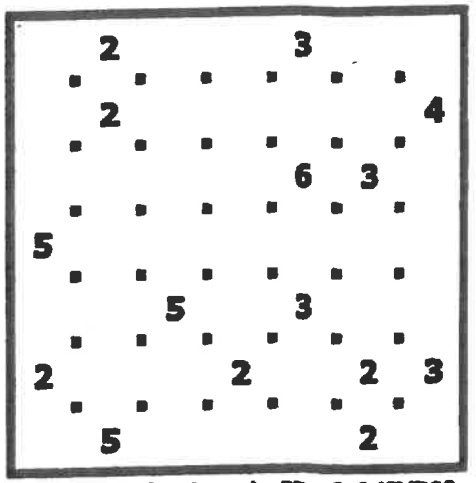
7x7 Shikaku Puzzle ID: 6,712,611



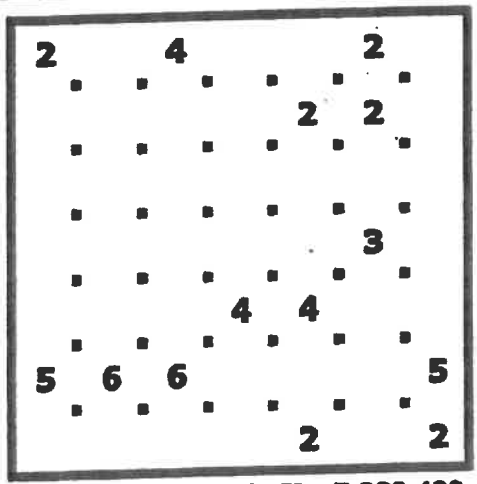
7x7 Shikaku Puzzle ID: 5,102,328



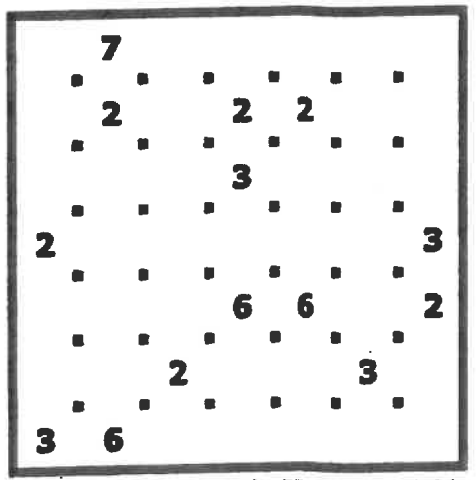
7x7 Shikaku Puzzle ID: 3,086,723



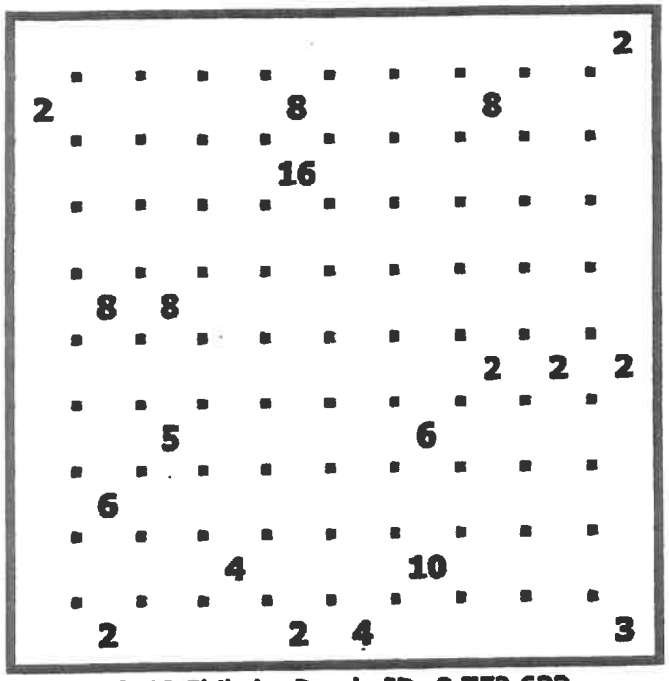
7x7 Shikaku Puzzle ID: 9,047,763



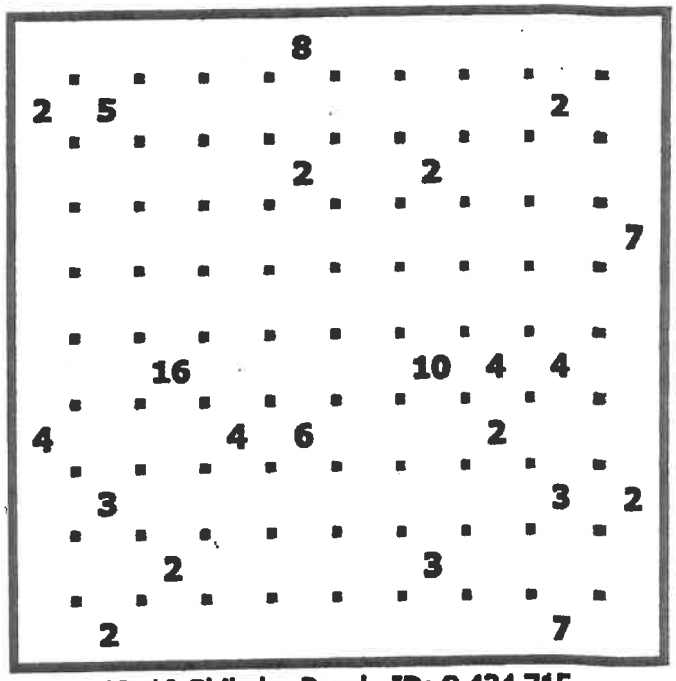
7x7 Shikaku Puzzle ID: 5,889,498



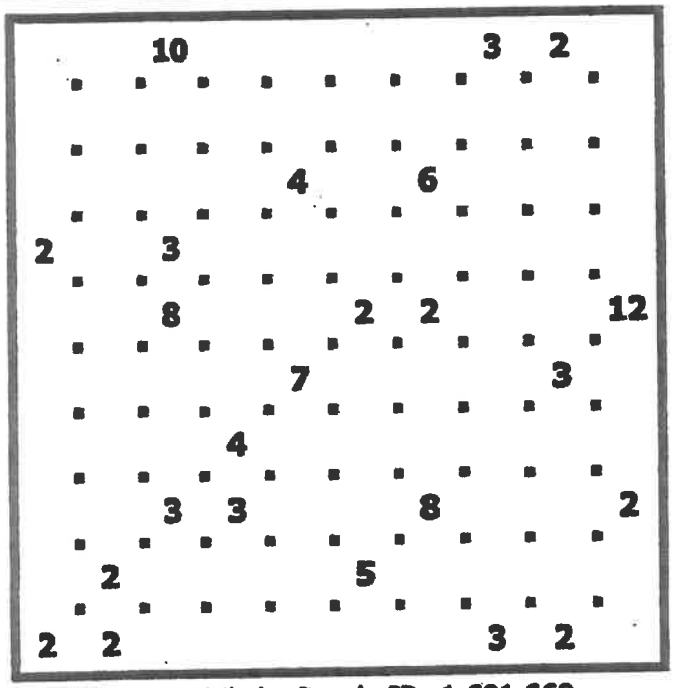
7x7 Shikaku Puzzle ID: 9,134,361



10x10 Shikaku Puzzle ID: 9,753,633

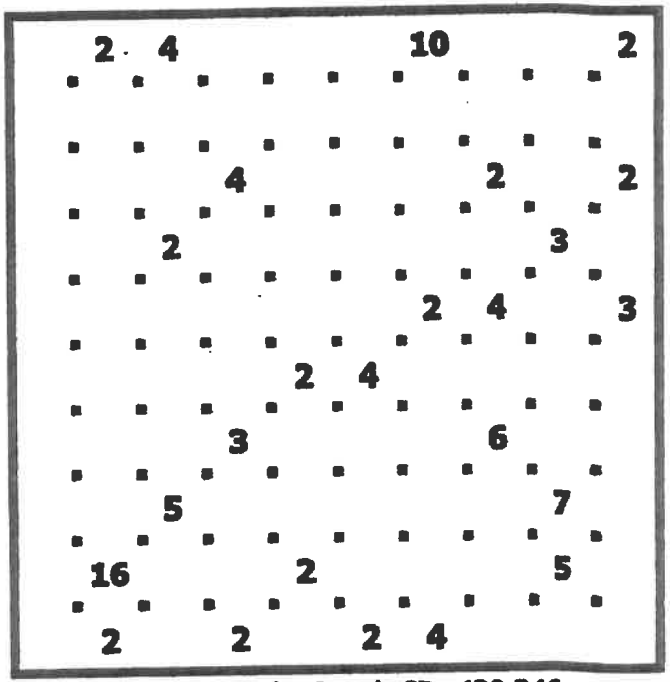


10x10 Shikaku Puzzle ID: 9,434,715



10x10 Shikaku Puzzle ID: 1,601,669

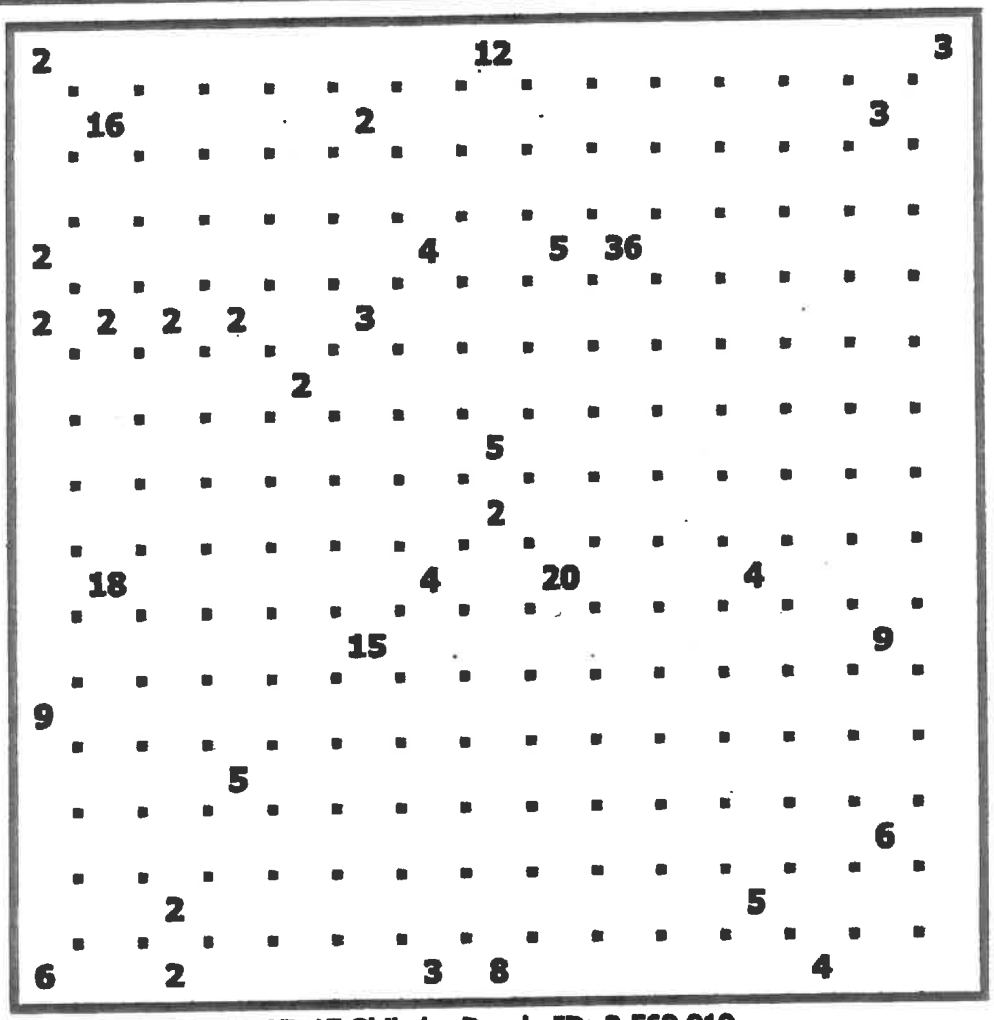
Spicy



10x10 Shikaku Puzzle ID: 430,346

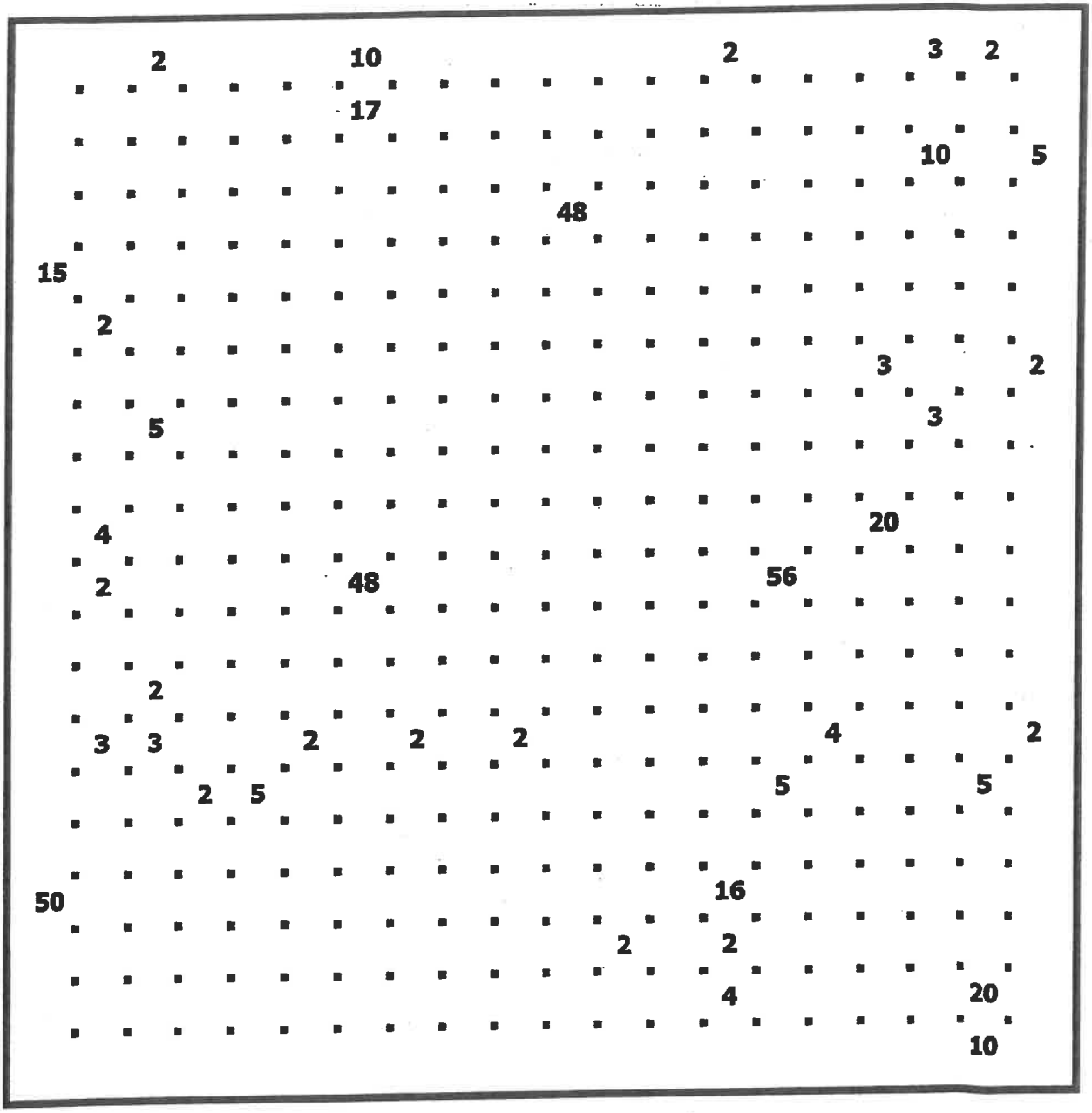
SHIKAKU

Ghost Pepper



15x15 Shikaku Puzzle ID: 2,568,919

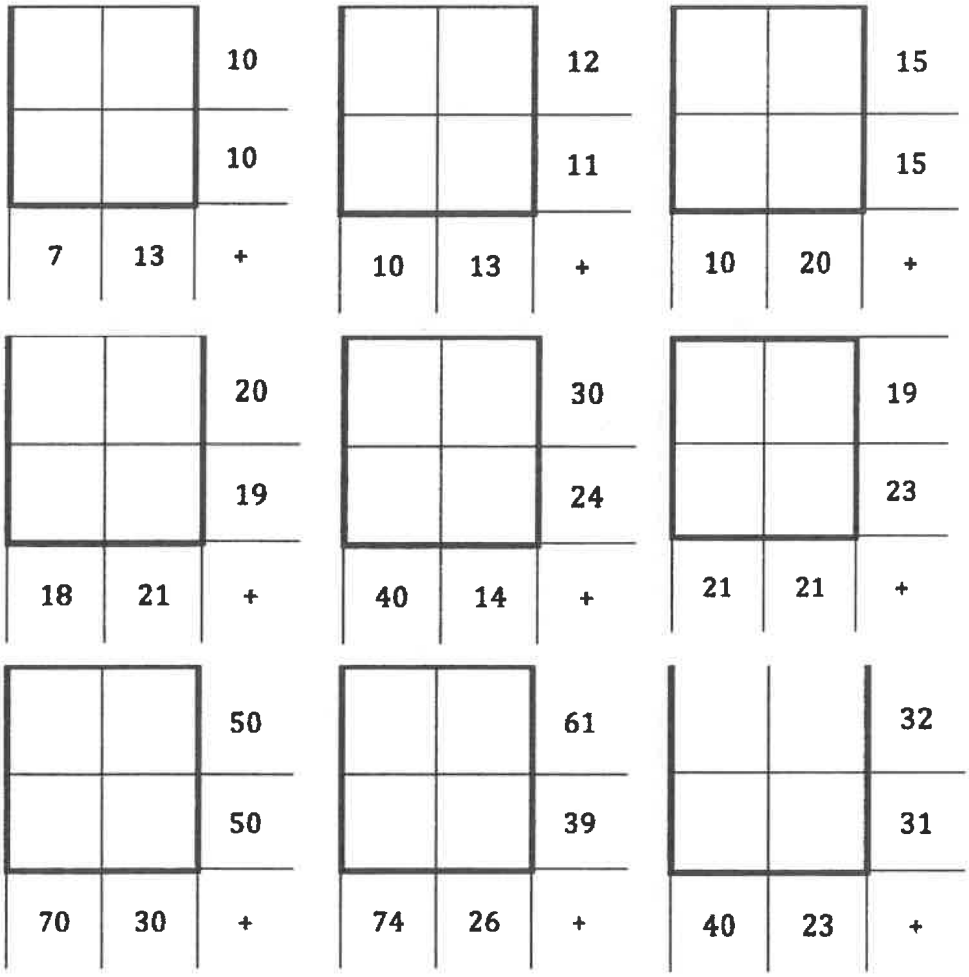
Volcano



20x20 Shikaku Puzzle ID: 6,250,110

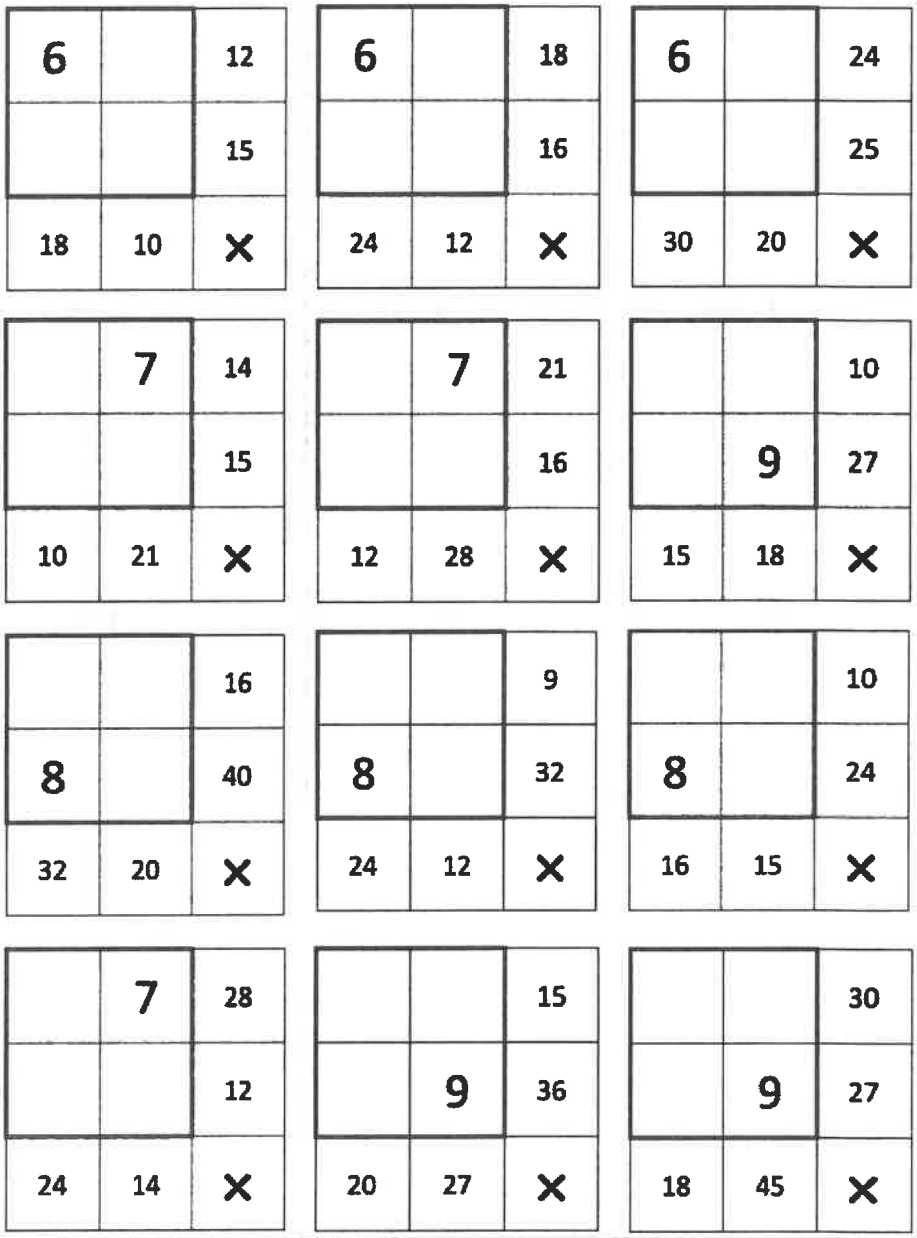
More Logic Puzzles: hide

Yohaku : (Addition)



Get more Yohaku .... https://www.yohaku.ca/a-new-type-of-number-puzzle.html

Yohaku 2 : (Multiplication, Mild)



Get more Yohaku .... https://www.yohaku.ca/a-new-type-of-number-puzzle.html

Yohaku 3x3 : Multiplication, Medium

			64
			35
			198
6	168	440	×

Use 9 different whole numbers.

			88
			140
			294
132	80	343	×

Use 9 different whole numbers.

			26
			105
			528
36	154	260	×

Use 9 different whole numbers.

			65
			36
			252
60	182	54	×

Use 9 different whole numbers.

			105
			24
			1001
52	462	105	×

Use 9 different whole numbers.

			70
			135
			392
36	735	140	×

Use 9 different whole numbers.

			56
			36
			432
16	288	189	×

Use 9 different whole numbers.

			52
			495
			84
1144	70	27	×

Use 9 different whole numbers.

			12
			160
			432
180	384	12	×

Use 9 different whole numbers.

Get more Yohaku .... https://www.yohaku.ca/a-new-type-of-number-puzzle.html

Yohaku 3x3 : Multiplication, Spicy

			140
			135
			192
168	40	540	×

Use 9 consecutive numbers.

			180
			84
			240
84	240	180	×

Use 9 consecutive numbers.

			3
			24
			0
8	0	36	×

Use 9 consecutive integers.

			40
			-18
			0
4	0	30	×

Use 9 consecutive integers.

			-24
			-6
			0
-16	4	0	×

Use 9 consecutive numbers.

			120
			-12
			0
18	8	0	×

Use 9 consecutive numbers.

			308
			480
			135
264	630	120	×

Use 9 consecutive numbers.

			360
			840
			264
360	385	576	×

Use 9 consecutive numbers.

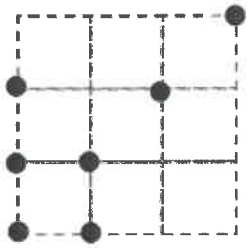
			396
			300
			168
60	462	720	×

Use 9 consecutive numbers.

Get more Yohaku .... https://www.yohaku.ca/a-new-type-of-number-puzzle.html

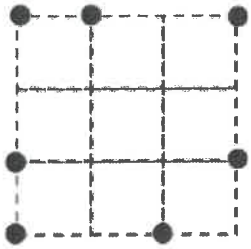
Zukei Puzzles by Naoki Inaba

(1)



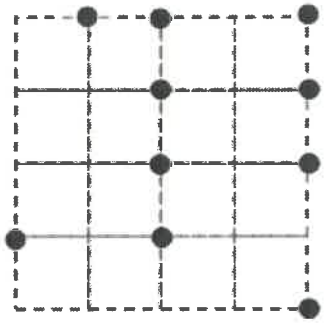
Square

(2)



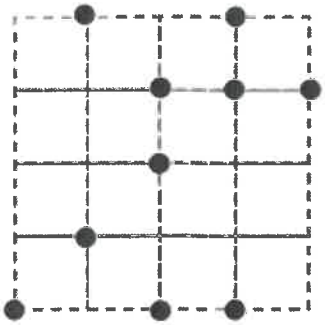
Rectangle

(3)



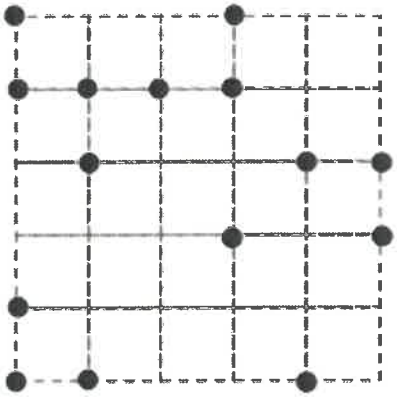
Square

(4)



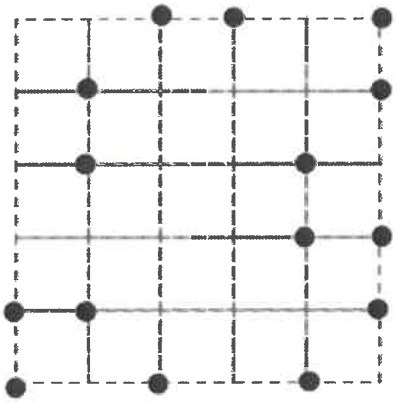
Rectangle

(5)



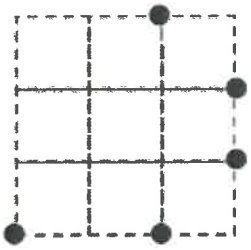
Square

(6)



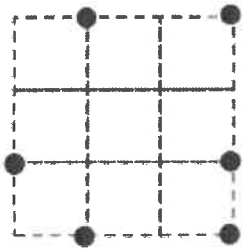
Rectangle

(7)



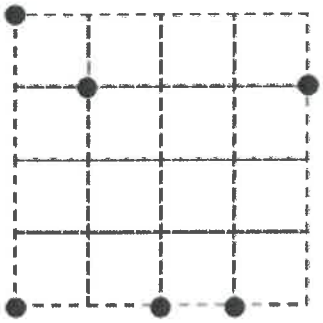
Right Triangle

(8)



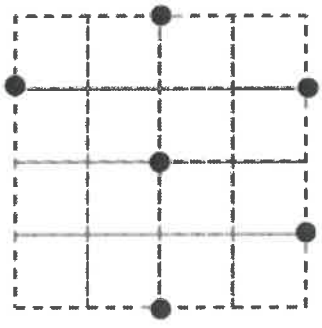
Isosceles Right Triangle

(9)



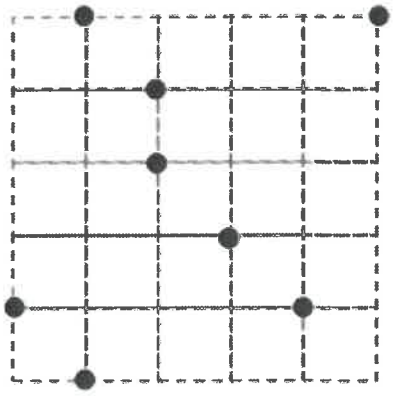
Isosceles Triangle

(10)



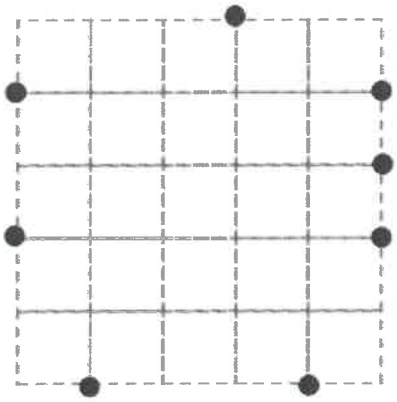
Right Triangle

(11)



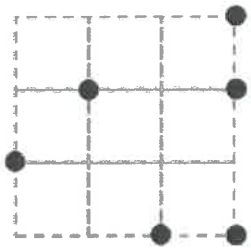
Isosceles Right Triangle

(12)



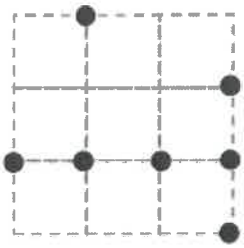
Isosceles Triangle

(13)



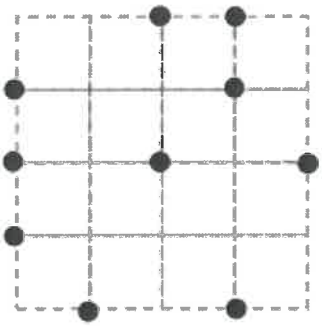
Trapezoid

(14)



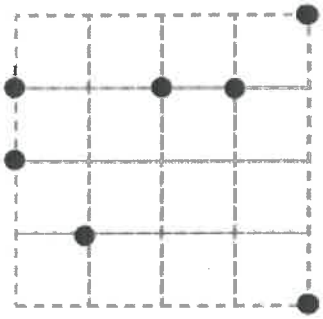
Parallelogram

(15)



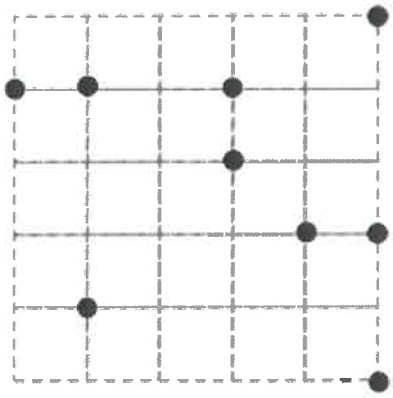
Rhombus

(16)



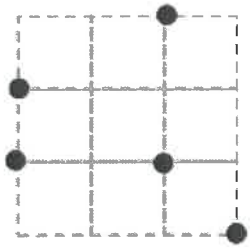
Trapezoid

(17)



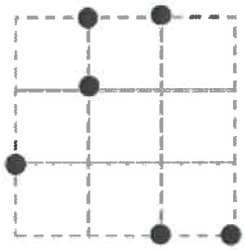
Parallelogram

(19)



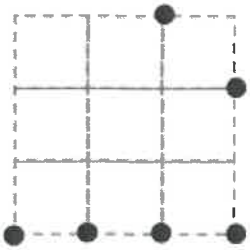
Right Triangle

(20)



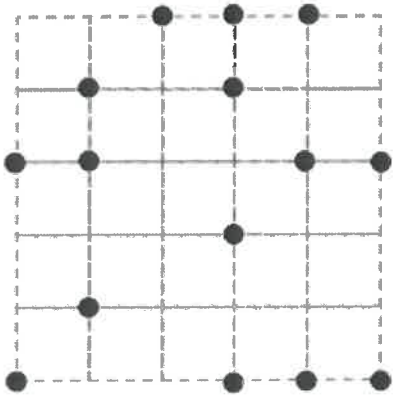
Parallelogram

(21)



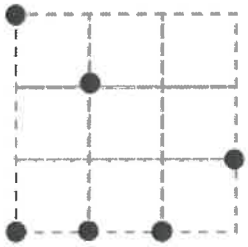
Isosceles Right Triangle

(18)



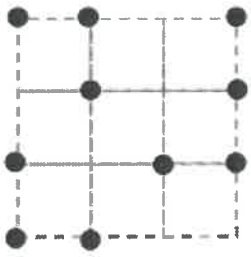
Rhombus

(22)



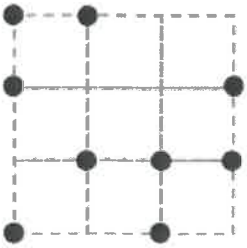
Trapezoid

(23)



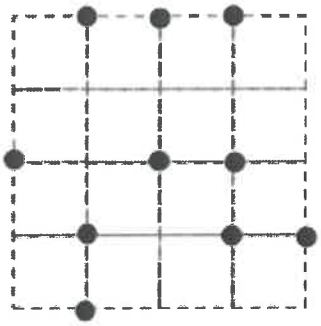
Square

(24)



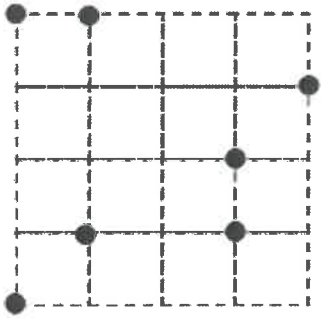
Rectangle

(25)



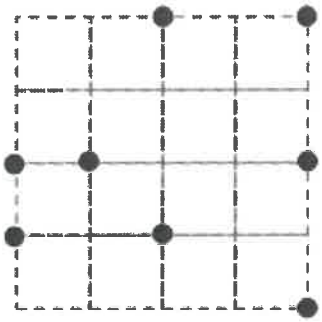
Rhombus

(26)



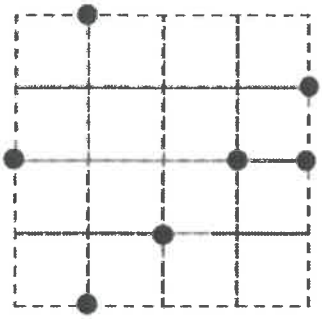
Isosceles Triangle

(27)



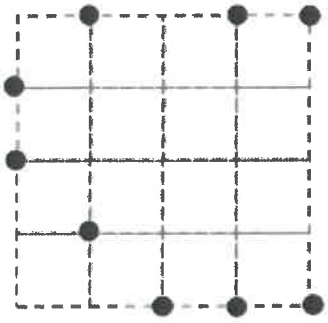
Parallelogram

(28)



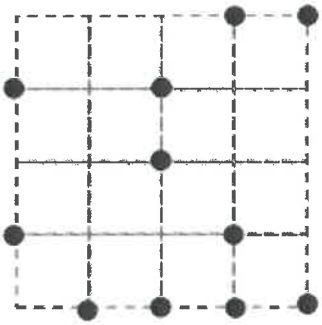
Trapezoid

(29)



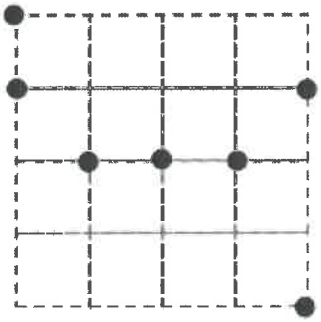
Isosceles Right Triangle

(30)



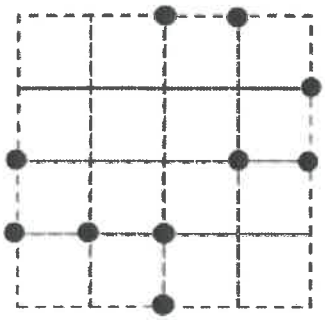
Rectangle

(31)



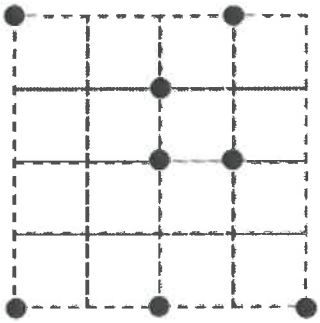
Isosceles Triangle

(32)



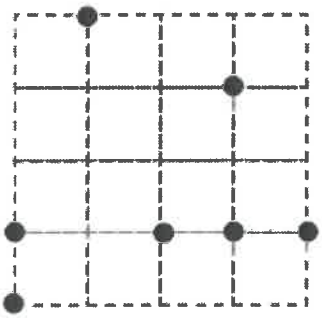
Square

(33)



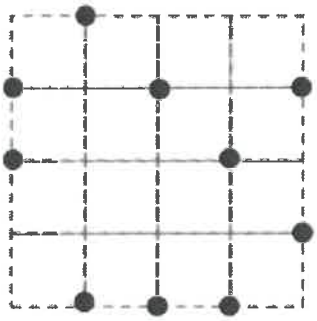
Parallelogram

(34)



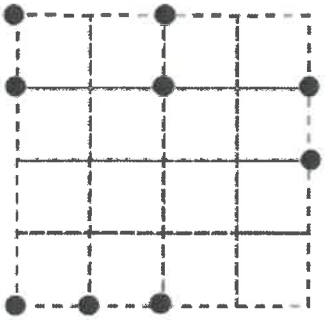
Trapezoid

(35)



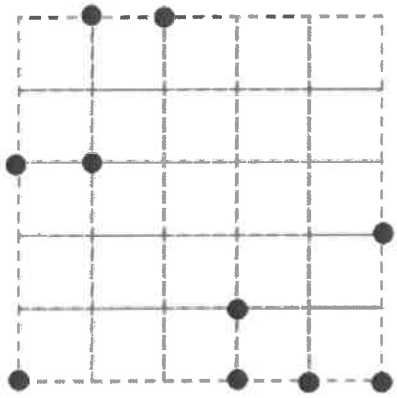
Rectangle

(36)



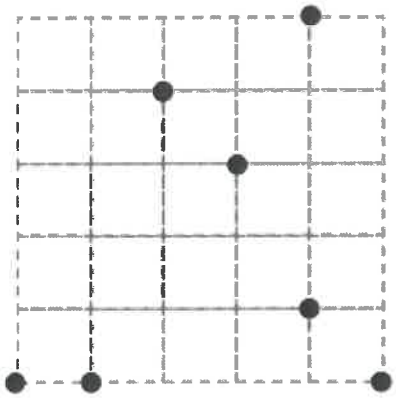
Isosceles Right Triangle

(37)



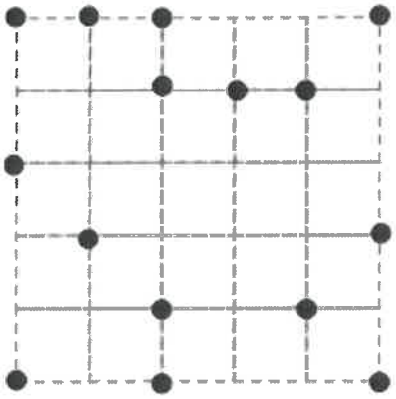
Rectangle

(38)



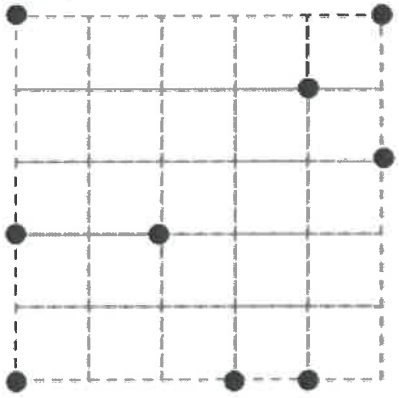
Right Triangle

(39)



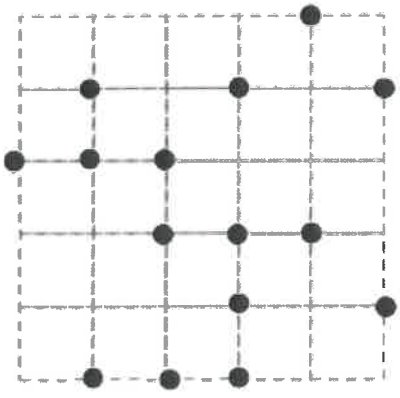
Square

(40)



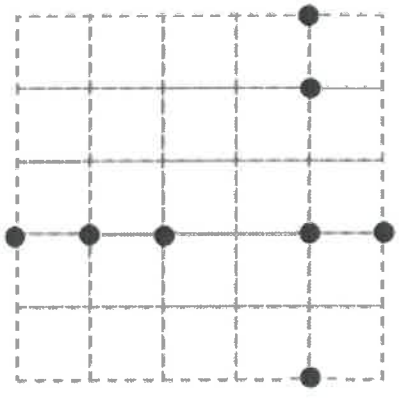
Parallelogram

(41)



Rhombus

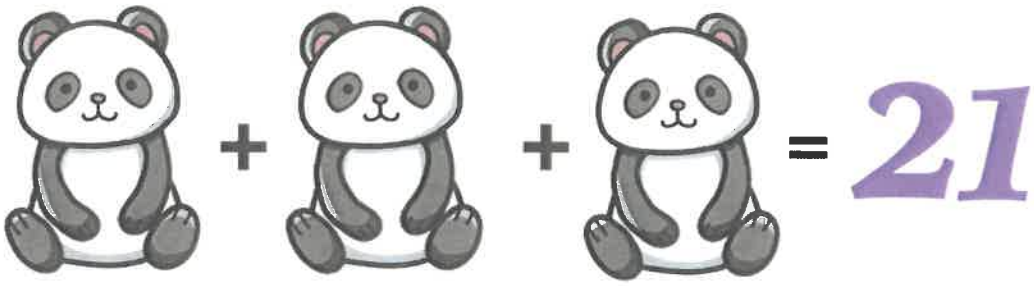
(42)

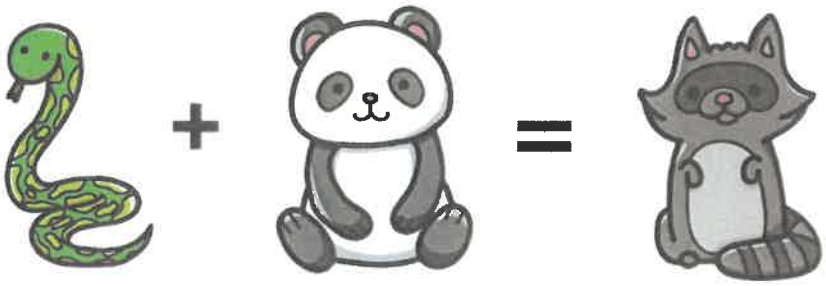


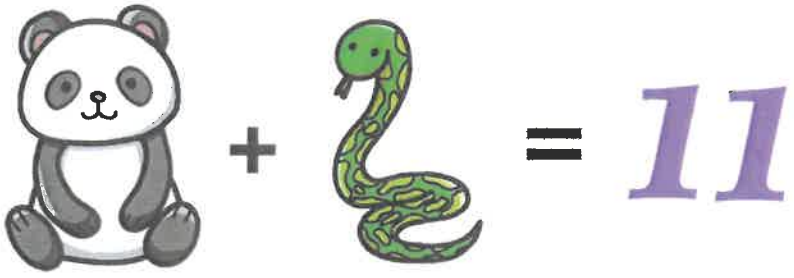
Trapezoid

Name: _____ **Date:** _____

Challenge #1 of 101



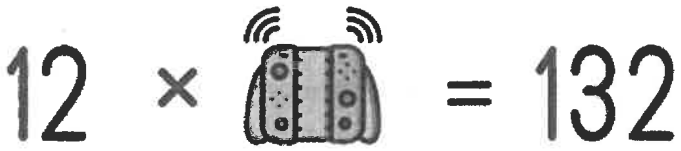


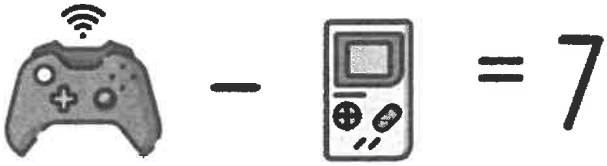


Name: _____

Directions: Use your math skills to find the value of each symbol and the ? in the puzzle below:

mashupmath





KEY

Switch Controller = 11
Pac-Man Game = 11
Gameboy = 9
X-Box Controller = 16
? = 176

<><><>

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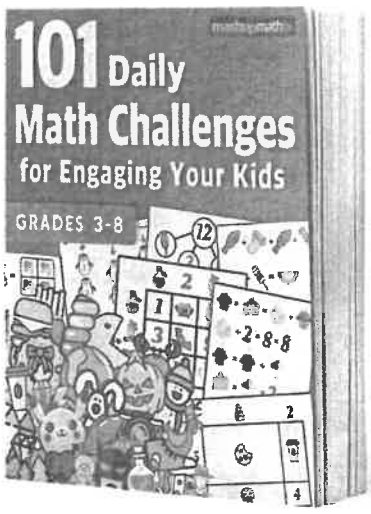
Topics Include:

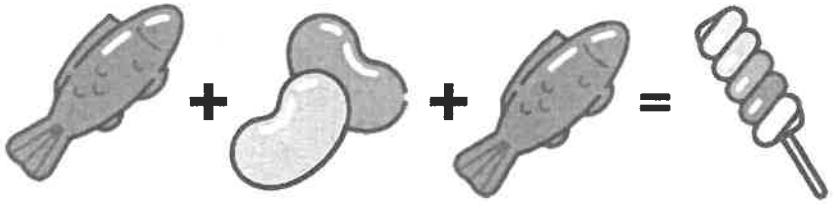
-logical thinking
-order of operations
-fractions and ratios
-decimals
-factoring
-function tables
-area models
-hundreds charts
-and much more!

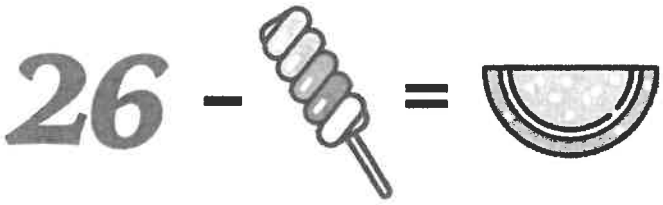


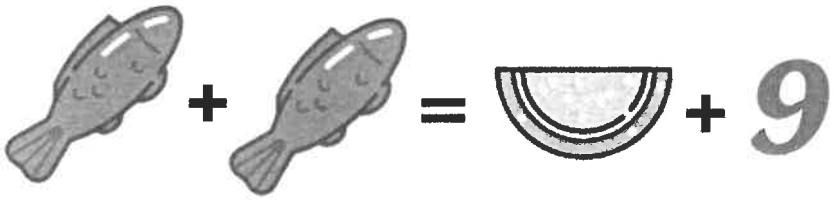
Name: _____

Directions: Use your math skills to find the value of each symbol and the ? in the puzzle below:

mashupmath







KEY

Lime Candy = 1
Fish Candy = 5
Swirly Pop = 25
Jelly Beans = 15
? = 10

<><><>

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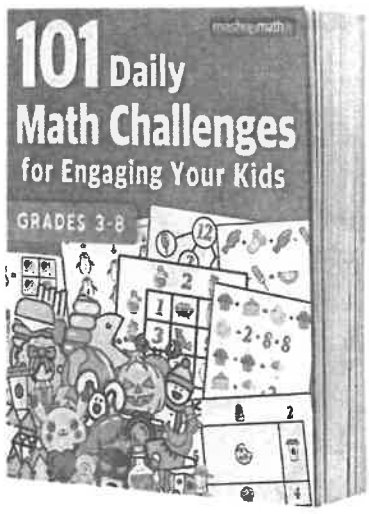


CAMPBELL RIVER
School District 72

SNAP 3
Number Sense (0 – 1000)

Name: _____

Date: _____

Draw to represent the value of the number

Write to describe your picture

Write the number in expanded form

Create 3 equations that equal the number

Write a real-life example that shows the value of the number

Count forwards by ____ from the number.

Count backwards by ____ from the number.

Communicating & Representing

Understanding & Solving

Show where the number belongs on the number line

0 1000

Reasoning & Analyzing

Connecting & Reflecting: Where is this number likely to show up?

Adapted from Student Numeracy Assessment and Practice (SNAP), SD33

CAMPBELL RIVER
School District 72

SNAP 3
Operations (Subtraction)

Name: _____

Date: _____

Operation: _____

Estimate – justify your thinking:

Represent with a sketch or drawing :

Explain your sketch :

Calculate:

Write a Real-Life Example or Word Problem: _____

_____

_____

Connecting & Reflecting: How well does the context make sense? Is it possible? Is it realistic? What would make it better?

Communicating & Representing	Understanding & Solving	Reasoning & Analyzing	Connecting & Reflecting

Adapted from Student Numeracy Assessment and Practice (SNAP), SD33

CAMPBELL RIVER
School District 72

SNAP 4
Number Sense (0 – 10 000)

Name: _____

Date: _____

Draw to represent the value of the number

Write to describe your picture

Write the number in expanded form

Create 3 equations that equal the number

Write a real-life example that shows the value of the number

Count forwards by ____ from the number.

Count backwards by ____ from the number.

Communicating & Representing

Understanding & Solving

Show where the number belongs on the number line

0 10 000

Reasoning & Analyzing

Connecting & Reflecting: Where is this number likely to show up?

Adapted from Student Numeracy Assessment and Practice (SNAP), SD33

CAMPBELL RIVER
School District 72

SNAP 4
Operations (Multiplication)

Name: _____

Date: _____

Operation: _____

Estimate – justify your thinking:

Represent with a sketch or drawing :

Explain your sketch :

Calculate:

Write a Real-Life Example or Word Problem: _____

_____

_____

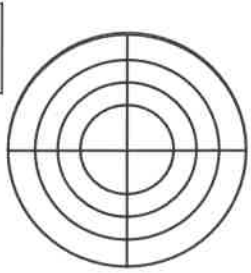
Connecting & Reflecting: How well does the context make sense? Is it possible? Is it realistic? What would make it better?

Communicating & Representing

Overall

Reasoning & Analyzing

Estimate & Justify



Understanding & Solving

Represent & Calculate

Connecting & Reflecting

Real-Life Problem & Reflection

Adapted from Student Numeracy Assessment and Practice (SNAP), SD33

CAMPBELL RIVER
School District 72

SNAP 5
Number Sense (0 – 1 000 000)

Name: _____

Date: _____

Draw to represent the value of the number

Write to describe your picture

Write the number in expanded form

Create 3 equations that equal the number

Write a real-life example that shows the value of the number

Count backwards by ____ from the number.

Count forwards by ____ from the number.

Communicating & Representing

Understanding & Solving

Show where the number belongs on the number line

0 — 1 000 000

Reasoning & Analyzing

Connecting & Reflecting: Where is this number likely to show up?

Adapted from Student Numeracy Assessment and Practice (SNAP), SD33

CAMPBELL RIVER
School District 72

SNAP 5
Operations (Division)

Name: _____

Date: _____

Operation: _____

Estimate – justify your thinking:

Represent with a sketch or drawing :

Explain your sketch :

Calculate:

Write a Real-Life Example or Word Problem: _____

_____

_____

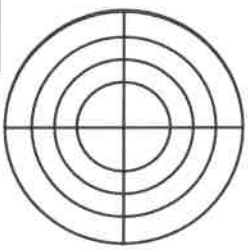
Connecting & Reflecting: How well does the context make sense? Is it possible? Is it realistic? What would make it better?

Communicating & Representing

Overall

Reasoning & Analyzing

Estimate & Justify



Understanding & Solving

Represent & Calculate

Connecting & Reflecting

Real-Life Problem & Reflection

Adapted from Student Numeracy Assessment and Practice (SNAP), SD33

CAMPBELL RIVER
School District 72

SNAP Rubric
Number Sense

Name: _____

Date: _____

Stretches

Strengths

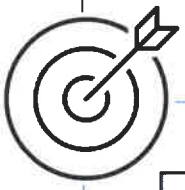
Communicating & Representing

- ☐ Pictures are clear and represent the target number accurately
- ☐ Descriptions are accurate and add clarity
- ☐ Information is organized in a way that makes it easy to understand
- ☐ Shape, spacing, and position of numbers respect place value and conventional ways of representing quantities

Understanding & Solving

- ☐ Uses grade-appropriate operations correctly
- ☐ Uses standard symbols and mathematical notation correctly
- ☐ Creates new equations from known facts.

(ex. a sum from a total, a difference from a sum, a factor from a product, etc.)



Connecting & Reflecting

- ☐ A reasonable real-life example is provided
- ☐ Example demonstrates understanding of the number value
- ☐ Reflection highlights both strengths and stretches

"I feel confident with _____

_____ was challenging

My goal is _____"

Reasoning & Analyzing

- ☐ Estimate is reasonable and 3 or more benchmarks are appropriately identified
- ☐ Pattern making (counting forward and backward is consistent and accurate
- ☐ Assumptions are logical & process shows evidence of planning or refinement

Overall Proficiency

Emerging | Developing | Proficient | Extending

CAMPBELL RIVER
School District 72

SNAP Rubric
Operations

Name: _____

Date: _____

Stretches

Strengths

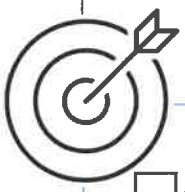
Communicating & Representing

- ☐ Communicates clear understanding multiple ways:
  - Written
  - Pictorial
  - Symbolic
- ☐ Uses **conventional** ways of representing quantities (ex. base 10, arrays, expanded form, standard, etc.)

Understanding & Solving

- ☐ Uses **grade-appropriate** strategies and operations to solve the problem and show understanding
- ☐ Uses standard symbols and mathematical notation correctly
- ☐ Creates new equations from known facts.

(ex. a sum from a total, a difference from a sum, a factor from a product, etc.)



Connecting & Reflecting

- ☐ Provides a reasonable real-life example
- ☐ Connects mathematical concepts to each other and to other topics
- ☐ Reflects on personal mathematical thinking strengths and stretches

"I feel confident with _____

I need to remember _____

My goal is _____"

Reasoning & Analyzing

- ☐ Estimation / mental math strategies are reasonable
- ☐ Any assumptions are logical and clearly stated
- ☐ Process is detailed (outlined, step by step) and shows evidence of planning or refining

Overall Proficiency

Emerging | Developing | Proficient | Extending

Adapted from Student Numeracy Assessment and Practice (SNAP), SD33

CAMPBELL RIVER
School District 72

Operational Fluency Trajectory (Grade 3-5)

Operational Fluency (3-5)	 (3)	 (4)	 (5)	
Understanding Additive (+/-) Strategies	Doubles, near doubles, +/- 0, 10 , 100, 1000 Model addition w/ base 10 blocks	Combos of 1, 10, 100, 1000, ex. adding bills and coins (parts and wholes)	Compensation (regroup / borrow) adding and subtract #s up to 6 digits, using place value	Selects and uses various additive strategies fluently
Understanding Multiplicative (x / ÷) Strategies	Multiples of 2, 10, 5 20, 50, 100	Doubling, Multiples of 3, 6, 9, 4	Knows multiples of 7, 8, 11	Squares, Near squares
Reasoning Compares number families	Even, Odd, x10, x5 Compare value of digits according to place value	Identify multiples of 3, 6, 9, 4 Finds patterns in groups of facts	Determines common multiples compares prime and composite #s	Determines common factors
Solving Compose / Decompose / Partitive Reasoning	Understands multiplication as repeated addition	Performs multiplication by counting by groups Decompose number into powers of 10	Uses properties of composite and prime numbers	Decomposes numbers flexibly & fluently in new contexts
Representing Modeling whole numbers* and unit fractions	Encodes/Decodes concrete visual models of numbers	Connects shape & space with number concepts (arrays, perimeter & area)	Creates visual models of whole and fractional numbers (pie and bar models)	Interprets and extends models to include "improper fractions" and mixed numbers

*Recommended Tool: animated prime factorisation visualization (moving dots)

Grade 3: Place value up to 1 000s (2-D models, arrays), benchmark fractions

Grade 4: to 10 000s, modular models (clocks), decimals (hundredths), Canadian currency (all)

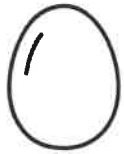
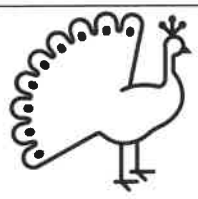
Grade 5: to 1 000 000s, decimals (thousandths), elapsed time, metric conversion (ex. mg to g to kg)

CAMPBELL RIVER
School District 72

Fact Fluency Trajectory (K-9)

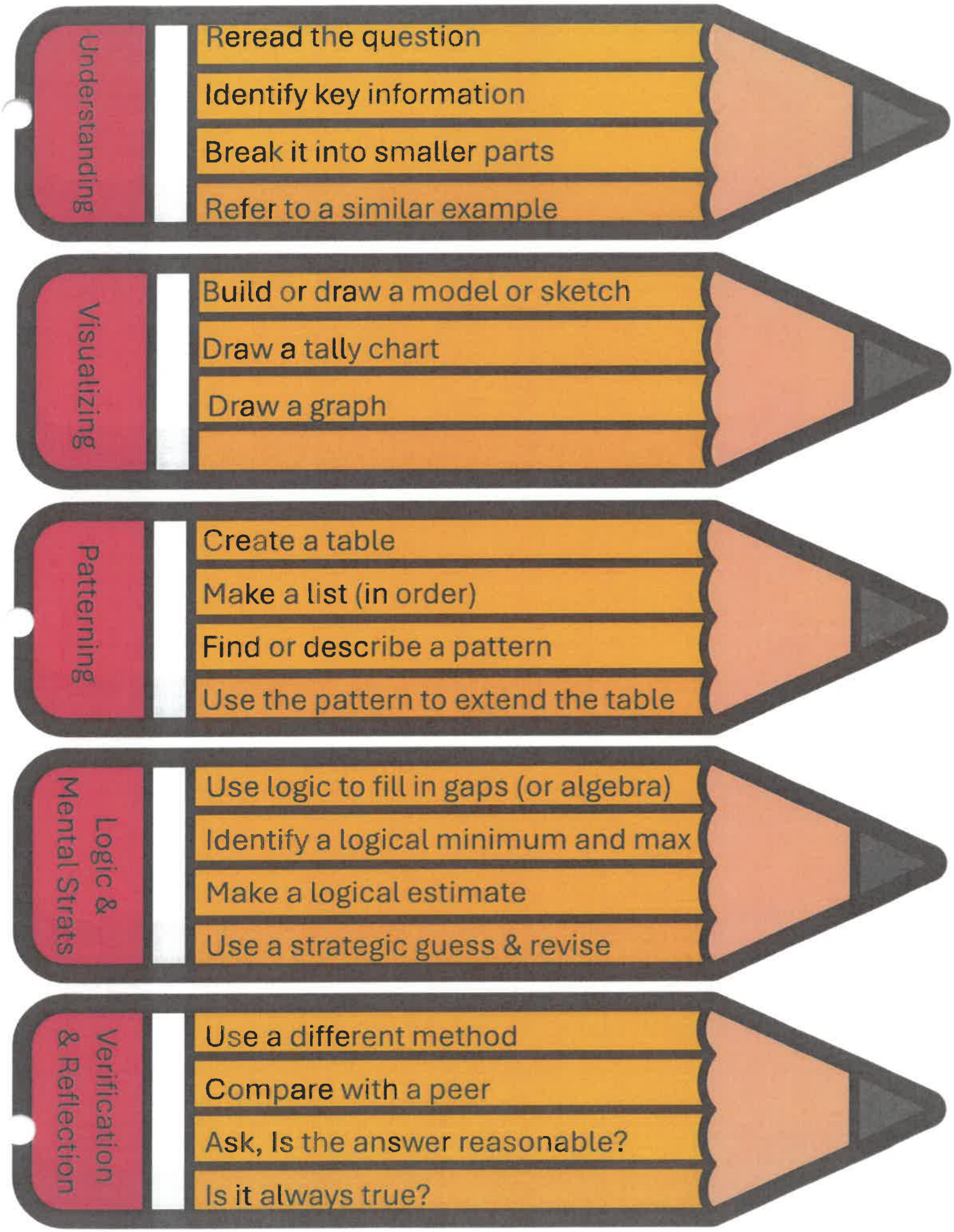
Name : _____

Date : _____

Fluency Stage	Addition*	Subtraction	Multiplication	Division (Factoring)
	Count On, 1 : 1, using tools	Count Back From, 1 : 1, using tools	Skip Counting, May use fingers	Guess and revise strategy Ex. Dividing a number by any number smaller than itself, chosen randomly.
	Making Ten	Think of related addition fact	Knows Benchmarks (x1, x10, x5, x2)	Strategic elimination (use a list of prime numbers 2, 3, 5, 7, ... and eliminate one at a time)
	Compensation (Regrouping) Ex. 18 + 7 = 18 + (2 + 5) = (18 +2) + 5 = 25	Take from 10 (compensation) Ex. 21-8 =21-10+2 =11+2 =13	Adds a group onto a benchmark multiple* 6 x 9 =5 x 9 +9 = 45+9	Recognizes fact families (remembers patterns in products of 2,5,10)
	Doubles and Near-Doubles	Subtract in parts (partition) Ex. 21-8 =21-1-7	Subtract a group from a benchmark multiple* 8 x 9 =8 x 10 – 8 = 80-8 = 72	Divides in parts (according to place value or benchmarks) 85 ÷ 5 = (40÷5)+ (40÷5)+ (5÷5) = 8 + 8 + 1 = 17
	Rounds one addend up and then uses subtraction 28+17 =28+20-3 =48-3	Same distance = same difference 200-18 = 199-17 (reduce both by 1) 199 - 17 182	Uses squares or other known facts Ex. 7 x 8 = 7 x 7 + 7 = 49 + 7 = 56	Thinks of related multiplication fact (connects to inverse operation) Ex. 60 ÷ 5 = 12 because 12 x 5 = 60

*Benchmark sums: 10s, doubles

*Benchmark multiples: x 1, 2, 5, 10 then 2, 4, 8 then 3, 6, 9 then 7 , 11 , 12, 13


Understanding
Reread the question
Identify key information
Break it into smaller parts
Refer to a similar example
Visualizing
Build or draw a model or sketch
Draw a tally chart
Draw a graph
Patterning
Create a table
Make a list (in order)
Find or describe a pattern
Use the pattern to extend the table
Logic & Mental Strats
Use logic to fill in gaps (or algebra)
Identify a logical minimum and max
Make a logical estimate
Use a strategic guess & revise
Verification & Reflection
Use a different method
Compare with a peer
Ask, Is the answer reasonable?
Is it always true?

Self - Assessment Writing