



# Developing Math Talent in Elementary Students

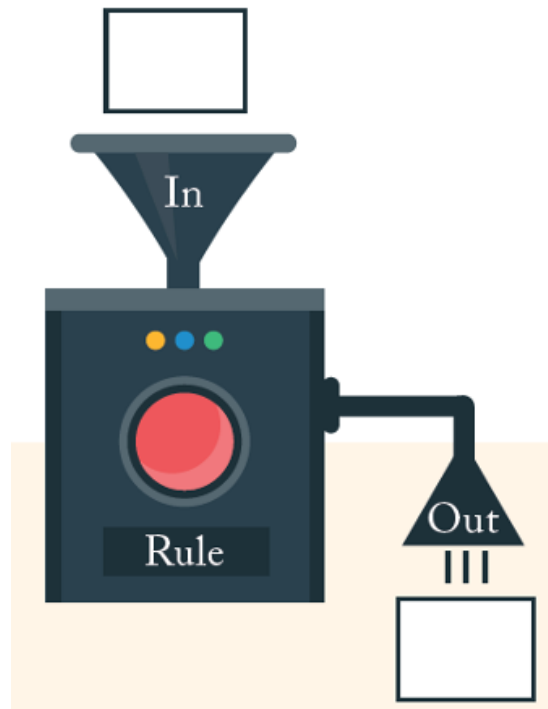
**Confratute 2024**

**Day 3  
Advanced Activities  
Algebraic Thinking**

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# As A Rule Game



## Directions

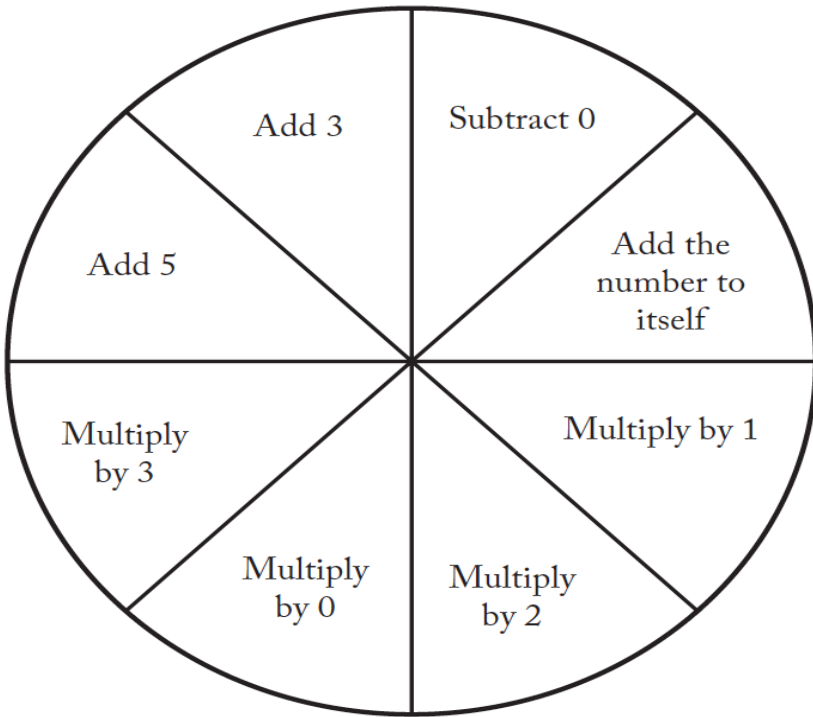
### Directions

1. The Machine operator spins for the first round and does not show it to the others.
2. Put the As a Rule Machine where everyone can see it.
3. On the rule machine, Player 1 writes one number in the In box on the machine using the marker.
  - The Machine Operator uses the rule from the spinner and writes the answer in the Out box.
  - *Remember that no one says a word!*
4. All players record the numbers in the In box and the Out box on the As a Rule Record Sheet.
  - The Machine Operator then erases both numbers.
5. Play continues.
  - Player 2 writes a new number in the In box.
  - The Machine Operator uses the same rule and writes the answer in the Out box.

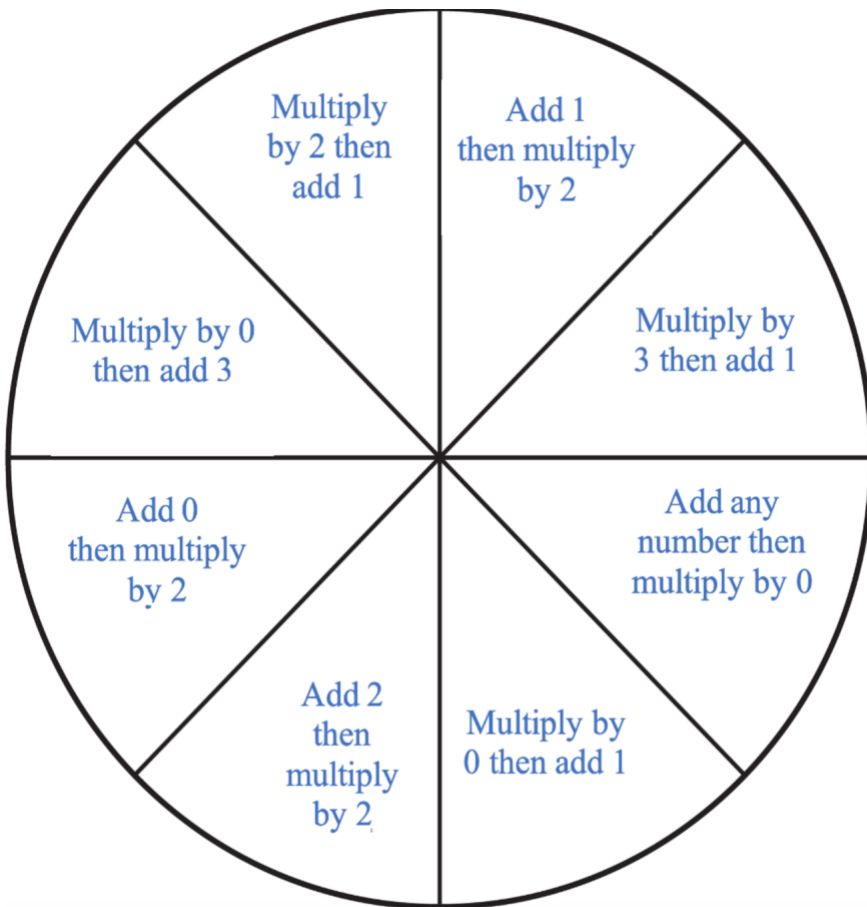
# As a Rule Record Sheet

In	Out

Rule \_\_\_\_\_

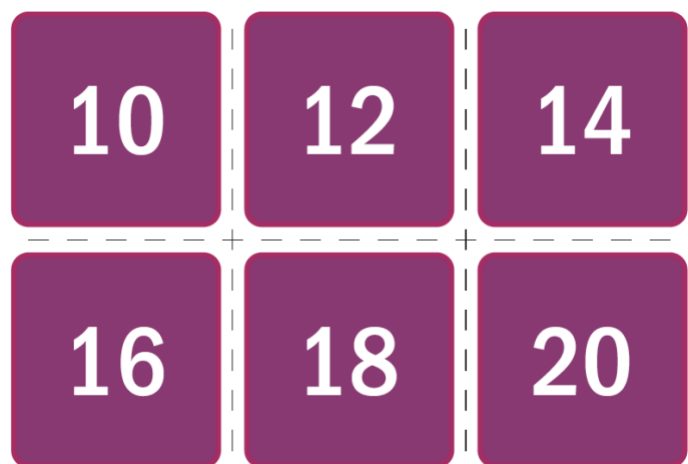


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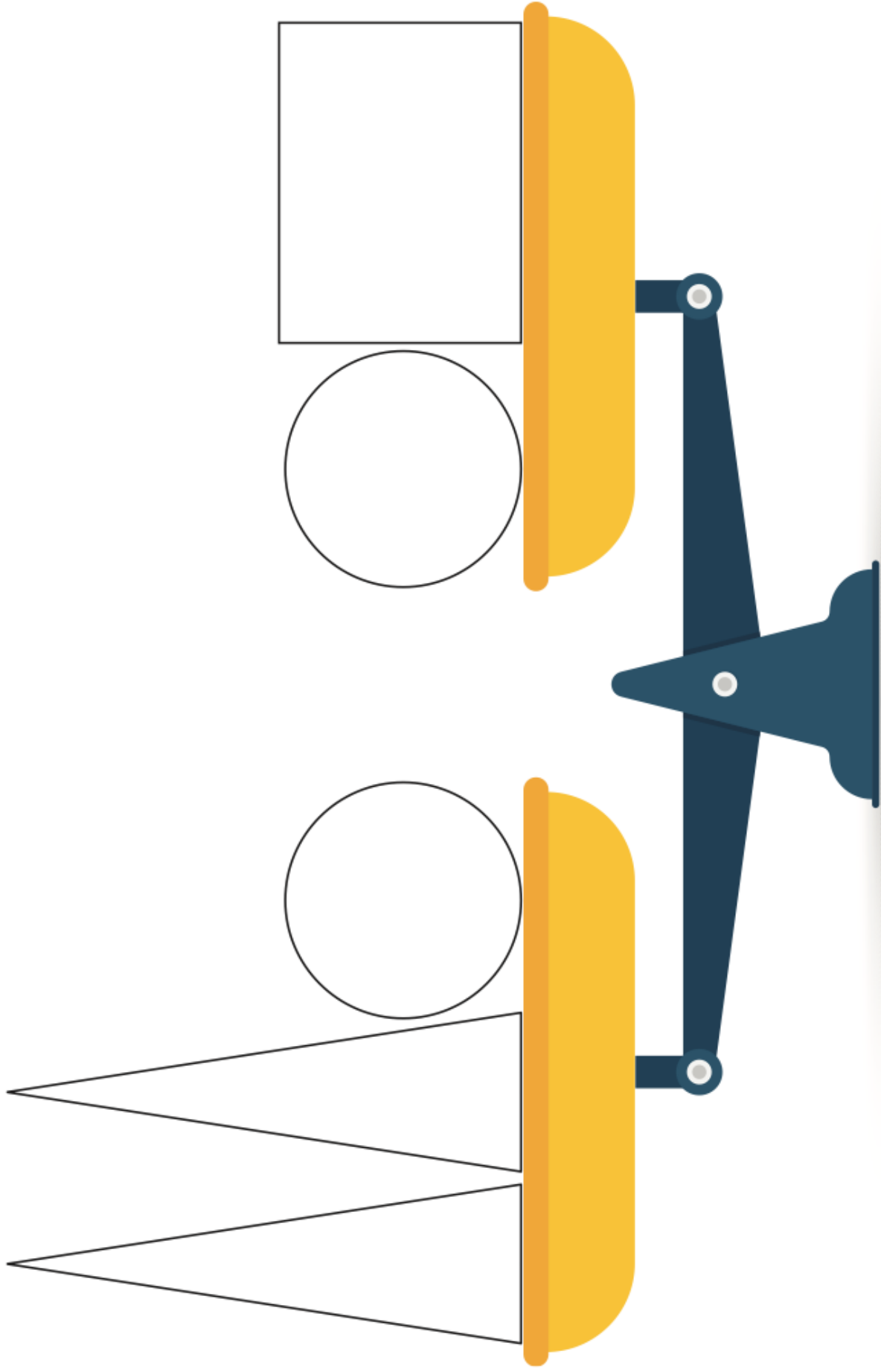


## Keep Your Balance Directions

- You may play by yourself or with a partner/team. Each player needs 30 small counters and pp. 45-47 of your *Student Mathematician's Journal*. You also need one set of Keep Your Balance Number Cards.
- Record the scale number. Start with Scale 1 and alternate scales each round.
- Place the Keep Your Balance Number Cards face down in a pile. Turn over the top card. Each player takes this number of counters and records it.
- Arrange all the counters inside the shapes on the scale so there are the **same total number of counters on each side**. Use these rules:
  - Same shapes must have the same value (same number of counters).
  - Each shape must have at least one counter.
- Record the number of counters and a matching equation on your record sheet.
- Try to find new solutions and record these on your record sheet.
- Share and check to make sure everyone's solutions are correct.
- Play another round with a new Keep Your Balance Number Card. Record all your solutions.
- If you like to compete, the winner is the player with the greatest number of correct solutions for all rounds.



# Keep Your Balance Scale #1



# Keep Your Balance Record Sheet

Round	Total Counters	Scale Number	▲	●	▬	Equation
<p style="text-align: center; font-size: 2em; margin: 0;"><b>1</b></p> <p>Score for the Round (number of equations)</p> <p>_____</p>						
<p style="text-align: center; font-size: 2em; margin: 0;"><b>2</b></p> <p>Score for the Round (number of equations)</p> <p>_____</p>						
<p style="text-align: center; font-size: 2em; margin: 0;"><b>3</b></p> <p>Score for the Round (number of equations)</p> <p>_____</p>						

## Equation Creations

In this game, you use all four operations (+, -, ×, and ÷), parentheses, and exponents to create equations. Play it with two, three, or four people.

### Equation Creations Directions

- You need Digit Cards, or a 10-sided die, and a timer.
- One player selects four cards from the Digit Cards deck or rolls the die four times. Digits can repeat. Zeros are not allowed. Digits cannot be combined to make two-digit numbers. Record the digits on the score sheet.
- Each player uses 2, 3, or 4 of the digits selected to write equations that are equal to **20** on the score sheet. Play four rounds. Each round lasts 10 minutes.
- For example, if the digits selected are: 2, 4, 5, and 8, the following equations could be created:
  - $4 \times 5 = 20$
  - $(8 \times 5) \div 2 = 20$
  - $(8 \times 2) + 4 = 20$
  - $2^5 - 4 - 8 = 20$
- When time is up, players share their equations and check that they all are true.
- Players calculate their score for the round using the following rules:
  - Add 1 point for each digit used (maximum 4).
  - Add 1 point for each operation used. The same operation can be used more than once in an equation.
  - Subtract 3 points for each incorrect equation. This may be due to the incorrect placement of parentheses or not following the order of operations. No other points are awarded.
  - Scores for some equations are shown.

• $5 \times 4 = 20$	+3 points (2 digits, 1 operation)
• $(8 \times 5) \div 2 = 20$	+5 points (3 digits + 2 operations)
• $2^5 - 4 - 8 = 20$	+7 points (4 digits, 3 operations)
• $8 \div (2 \times 5) = 20$	-3 points (this equation $\neq$ 20)
- The sum of the number of points for all correct equations is each player's score for that round.
- Play again using new digits. Pick a new target number between 20 and 40 for the next round. Talk to your teacher about using different target numbers.





# Equation Creations Score Sheet

Digits: \_\_\_\_\_

Target Number: \_\_\_\_\_

Write one equation on each row.

Equations	Points
<b>Total Score</b>	

## Variable Puzzles

The same variables (letters) have the same value everywhere in an individual puzzle, but the value may change from one puzzle to another. Different variables in a puzzle have different values. The numbers at the end of each row and column are the sums of all the values in that row or column. Find the value for each variable.

1	Column 1	Column 2	Column 3	Row Total	
Row 1	<i>D</i>	9	<i>C</i>	17	<i>C</i> = _____
Row 2	<i>D</i>	<i>D</i>	10	22	<i>D</i> = _____
Row 3	3	<i>C</i>	<i>C</i>	7	
Column Total	15	17	14		

2	Column 1	Column 2	Column 3	Row Total	
Row 1	7	<i>F</i>	8	24	<i>E</i> = _____
Row 2	<i>E</i>	<i>F</i>	3	16	<i>F</i> = _____
Row 3	<i>F</i>	<i>F</i>	<i>E</i>	22	
Column Total	20	27	15		

3	Column 1	Column 2	Column 3	Row Total	
Row 1	4	<i>G</i>	<i>H</i>	27	<i>G</i> = _____
Row 2	<i>G</i>	<i>G</i>	<i>H</i>	34	<i>H</i> = _____
Row 3	<i>G</i>	7	<i>H</i>	30	
Column Total	26	29	36		

4	Column 1	Column 2	Column 3	Row Total	
Row 1	6	<i>J</i>	<i>J</i>	12	<i>J</i> = _____
Row 2	8	<i>K</i>	<i>K</i>	16	<i>K</i> = _____
Row 3	<i>N</i>	<i>N</i>	<i>K</i>	18	<i>N</i> = _____
Column Total	21	14	11		

5	Column 1	Column 2	Column 3	Row Total	
Row 1	L	3	M	22	L = _____
Row 2	5	M	9	27	M = _____
Row 3	P	P	7	27	P = _____
Column Total	21	26	29		



6	Column 1	Column 2	Column 3	Row Total	
Row 1	R	Q	S	12	Q = _____
Row 2	S	R	9	20	R = _____
Row 3	S	S	8	26	S = _____
Column Total	20	12	26		


7	Column 1	Column 2	Column 3	Row Total	
Row 1	Z	8	W	11	W = _____
Row 2	7	Z	W	10	X = _____
Row 3	X	Y	Z	9	Y = _____
Column Total	13	13	4		Z = _____

8	Column 1	Column 2	Column 3	Row Total	
Row 1	A	4	B	16	A = _____
Row 2	B	13	2	25	B = _____
Row 3	7	C	A	15	C = _____
Column Total	19	23	14		



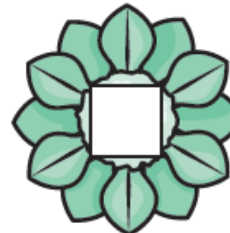
## Seasonal Symbols

Find the number that goes inside each symbol to make the equations true and write it in the white square. Same symbols have the same number value in each problem. Be sure to check your answers in both equations.

1.  +  = 19

 +  = 24

2.   $\div 2 = 5 \times 5$

 +  +  = 100


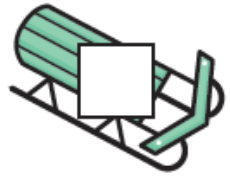
Which value did you find first in problem 2 — heart or flower? Explain why you started with this variable.

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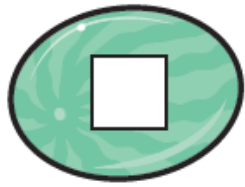
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3.  +  +  + 10 = 37


 +  = 14




4.  +  = 25



 -  = 11

 × 4 = 36

5.  +  =  + 5

 +  = 87

6.  +  = 

 +  = 15