



The Great Capacity Caper

Grade 5 math · Fractions of a number, Multiplication, Rounding, Order of operations · Reading level grades 5-6

Detective: _____ Date: _____

A sneaky saboteur has invaded the world-famous Fizz-O-Matic Juice Lab! They scrambled all the capacity labels on the giant mixing tanks, threatening to flood the city with sticky neon punch. We must calculate the correct volumes to restore order and catch the culprit before the grand opening!

1. Solve each math problem. The answer is a number, and the letter beside it is what that number stands for.
2. In the clue boxes, write that letter in every box showing the same number, then read the secret clue.
3. Use each clue to cross suspects off the list. The one suspect left at the end is the culprit!

My answer: the juice bandit is _____

Possible suspects

Cross off a row as each clue rules it out. The one left at the end is the culprit.

NAME	BLENDER POWER	SECRET INGREDIENT	DOMINANT HAND	HAIR EVIDENCE	CLEAN UP TOOL
Vince Valve	funnel vortex	sour powder	left-handed pouring	spiky hair	sponge wipe
Bella Blender	syrup spray	sweet crystals	right-handed pouring	slicked hair	soap bubbles
Mason Measurement	syrup spray	fizz drops	right-handed pouring	spiky hair	sponge wipe
Gus Gallon	flask freeze	neon dye	right-handed pouring	spiky hair	sponge wipe
Professor Pour	carbonation blast	heavy yeast	right-handed pouring	spiky hair	plain water
Fiona Fizz	funnel vortex	heavy yeast	right-handed pouring	curly hair	sponge wipe
Walter Water	stream beam	neon dye	right-handed pouring	spiky hair	sponge wipe
Pip Peppermint	syrup spray	fizz drops	left-handed pouring	slicked hair	sponge wipe
Sloane Splash	flask freeze	sweet crystals	right-handed pouring	slicked hair	sponge wipe
Sally Syrup	syrup spray	fizz drops	right-handed pouring	curly hair	soap bubbles
Quincy Quart	carbonation blast	fizz drops	left-handed pouring	curly hair	plain water
Celia Cylinder	flask freeze	fizz drops	left-handed pouring	spiky hair	soap bubbles
Beaker Bob	flask freeze	sour powder	right-handed pouring	slicked hair	plain water
Sammy Squeeze	funnel vortex	heavy yeast	left-handed pouring	spiky hair	plain water
Clara Cup	carbonation blast	neon dye	right-handed pouring	spiky hair	sponge wipe
Milton Milliliter	carbonation blast	heavy yeast	right-handed pouring	slicked hair	soap bubbles
Gemma Gush	syrup spray	sour powder	right-handed pouring	spiky hair	sponge wipe
Penny Pint	carbonation blast	sweet crystals	left-handed pouring	curly hair	plain water
Barnaby Bubbles	stream beam	sweet crystals	left-handed pouring	spiky hair	sponge wipe
Dexter Dilute	syrup spray	heavy yeast	right-handed pouring	spiky hair	plain water
Lulu Liter	carbonation blast	neon dye	left-handed pouring	spiky hair	plain water

CLUE 1

Fractions of a number

To find the thief's escape route, we must calculate a fraction of the total gallon tanks that were tampered with last night.

Solve each problem, then write its letter in every clue box that shows the same number.

A 2x10 grid of boxes. The top row contains the following sequence: 'T' (orange), empty, empty, empty, empty, empty, empty, 'T' (orange), empty, empty, empty, empty, empty, empty, empty, 'T' (orange). The bottom row contains the following sequence: empty, empty, empty, empty, empty, empty, empty, empty, empty, empty, empty, empty, empty, empty, empty, empty. Below each box is a number. The top row numbers are: 23, 17, 7, 40, 31, 18, 39, 25, 27, 23, 21, 37, 7, 32, 20, 37, 23. The bottom row numbers are: 31, 32, 7, 28, 27, 5, 5, 21, 25, 37, 39, 32.

$$1/6 \text{ of } 138 = \boxed{} \rightarrow \boxed{\text{T}}$$

$$\frac{1}{4} \text{ of } 124 = \boxed{} \rightarrow \boxed{\text{U}}$$

$$\frac{3}{4} \text{ of } 52 = \boxed{} \rightarrow \boxed{\text{P}}$$

$$\frac{3}{8} \text{ of } 56 = \boxed{} \rightarrow \boxed{\text{D}}$$

$1/6$ of 30 = $\rightarrow$ **Z**

$2/4$ of 80 = $\rightarrow$ **C**

$$\frac{4}{5} \text{ of } 25 = \boxed{} \rightarrow \boxed{\text{N}}$$

$$2/6 \text{ of } 51 = \boxed{} \rightarrow \boxed{\text{H}}$$

2/6 of 111 = → **0**

$$2/6 \text{ of } 96 = \boxed{} \rightarrow \boxed{\text{S}}$$

$$\frac{3}{4} \text{ of } 36 = \boxed{} \rightarrow \boxed{}$$

2/10 of 35 = → **E**

$$3/5 \text{ of } 30 = \boxed{} \rightarrow \boxed{\text{L}}$$

$$\frac{1}{3} \text{ of } 75 = \boxed{} \rightarrow \boxed{\text{R}}$$

$\frac{1}{2}$ of 56 = $\rightarrow$ **F**

Scratch space:

Multiplication facts (1-12)

The thief left a trail of identical spilled juice boxes. We can find the total volume lost by multiplying the rows by the boxes in each row.

Solve each problem, then write its letter in every clue box that shows the same number.

Two rows of 15 empty boxes each, representing a 2x15 grid. The first row has a red box at position 1 containing the letter 'R'. Below the first row are the numbers: 35, 18, 72, 96, 42, 96, 55, 54, 44, 1, 44, 36, 81, 14, 10, 42. The second row has a red box at position 6 containing the letter 'R'. Below the second row are the numbers: 81, 55, 42, 42, 1, 35, 54, 14, 54, 80, 55, 60, 60.

$$7 \times 5 = \boxed{} \rightarrow \boxed{\text{R}}$$

$$6 \times 9 = \boxed{} \rightarrow \boxed{\text{N}}$$

$$10 \times 8 = \boxed{} \rightarrow \boxed{W}$$

$9 \times 9 = \square \rightarrow \boxed{\mathbf{P}}$

$3 \times 12 = \square \rightarrow \mathbf{S}$

$$2 \times 7 = \boxed{} \rightarrow \boxed{0}$$

$8 \times 12 = \boxed{} \rightarrow \boxed{\text{H}}$

$$6 \times 3 = \boxed{} \rightarrow \left[\begin{array}{c} \text{I} \\ \text{II} \\ \text{III} \\ \text{IV} \\ \text{V} \\ \text{VI} \\ \text{VII} \\ \text{VIII} \\ \text{IX} \\ \text{X} \end{array} \right]$$

$$4 \times 11 = \boxed{} \rightarrow \boxed{\mathbf{D}}$$

$8 \times 9 = \boxed{} \rightarrow \boxed{\text{G}}$

$1 \times 1 = \boxed{} \rightarrow \boxed{\mathbf{E}}$

$6 \times 10 = \boxed{} \rightarrow \boxed{\text{L}}$

$11 \times 5 = \boxed{} \rightarrow \boxed{\text{A}}$

$$10 \times 1 = \boxed{} \rightarrow \boxed{\text{U}}$$

$6 \times 7 = \boxed{} \rightarrow \boxed{\text{T}}$

Scratch space:

CLUE 3

A damaged pressure gauge on Vat Four only shows estimated numbers, so we have to round the final liter reading to the nearest ten to unlock the logbook.

Solve each problem, then write its letter in every clue box that shows the same number.

Diagram showing two rows of boxes representing numbers. The top row has 15 boxes, with the 10th box containing an 'S' and the number 2300. The bottom row has 10 boxes, with the 10th box containing the number 370. The numbers in the boxes are: Row 1: 2300, 2900, 170, 7000, 1700, 130, 9000, 4300, 2900, 130, 130, 370, 30, 2300, 130, 50. Row 2: 700, 5000, 130, 4300, 370, 2900, 170, 9000, 130, 370.

Round 2,262 to the nearest hundred $\rightarrow$ **S**

Round 2,912 to the nearest hundred $\rightarrow$ **P**

Round 4,313 to the nearest hundred $\rightarrow$

Round 134 to the nearest ten $\rightarrow$ **E**

Round 54 to the nearest ten $\rightarrow$ **D**

Round 9,135 to the nearest thousand $\rightarrow$ **W**

Round 7,384 to the nearest thousand $\rightarrow$ **N**

Round 1,748 to the nearest hundred → **G**

Round 4,738 to the nearest thousand $\rightarrow$ **H**

Round 174 to the nearest ten $\rightarrow$

Round 29 to the nearest ten → **A**

Round 374 to the nearest ten $\rightarrow$ **R**

Round 715 to the nearest hundred $\rightarrow$ **T**

Scratch space:

CLUE 4

Order of operations

We found a torn scrap of paper with the thief's secret recipe steps. Solve the equation in the correct order of operations to find the code.

Solve each problem, then write its letter in every clue box that shows the same number.

S								S				S						
33	79	24	57	45	53	46	24	33	28	72	36	33	72	36	34	28	9	28

			S				
28	58	36	33	10	36	38	36

$6 \times 8 - 15 = \square \rightarrow \boxed{\text{S}}$

$3 + 5 \times 5 = \square \rightarrow \boxed{\text{T}}$

$60 + 4 \times 3 = \square \rightarrow \boxed{\text{L}}$

$3 \times 8 - 14 = \square \rightarrow \boxed{\text{C}}$

$6 \times 11 - 30 = \square \rightarrow \boxed{\text{E}}$

$4 \times 12 - 14 = \square \rightarrow \boxed{\text{F}}$

$5 + 2 \times 2 = \square \rightarrow \boxed{\text{A}}$

$11 \times 9 - 20 = \square \rightarrow \boxed{\text{P}}$

$12 + 9 \times 5 = \square \rightarrow \boxed{\text{K}}$

$31 + 5 \times 3 = \square \rightarrow \boxed{\text{R}}$

$20 + 2 \times 2 = \square \rightarrow \boxed{\text{I}}$

$12 \times 4 - 10 = \square \rightarrow \boxed{\text{N}}$

$39 + 7 \times 2 = \square \rightarrow \boxed{\text{B}}$

$27 + 2 \times 9 = \square \rightarrow \boxed{\text{Y}}$

$9 \times 9 - 23 = \square \rightarrow \boxed{\text{H}}$

Scratch space:

CLUE 5**Fractions of a number - the last clue**

Only a fraction of the original flavor syrup remains in the giant beaker. Figure out how many milliliters are left to trace where the thief went next.

First solve each problem. Then find each answer in the numbered list below and cross that sentence out. One sentence will be left - that is exactly what the villain did!

Step 1 - solve these:

$1/6 \text{ of } 48 = \boxed{}$

$7/8 \text{ of } 8 = \boxed{}$

$2/8 \text{ of } 44 = \boxed{}$

$3/4 \text{ of } 12 = \boxed{}$

$1/8 \text{ of } 8 = \boxed{}$

$5/10 \text{ of } 8 = \boxed{}$

$3/4 \text{ of } 16 = \boxed{}$

$2/4 \text{ of } 10 = \boxed{}$

$2/5 \text{ of } 25 = \boxed{}$

$1/10 \text{ of } 30 = \boxed{}$

$5/10 \text{ of } 4 = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain overfilled the mixing vat, then stole the master beaker.
2. The villain swapped the liter labels, then fled through the drainage duct.
3. The villain diluted the secret formula, then splashed sticky foam everywhere.
4. The villain clogged the intake pipe, then scrambled the pressure dials.
5. The villain drained the main reserve, then fled through the drainage duct.
6. The villain swapped the liter labels, then splashed sticky foam everywhere.
7. The villain overfilled the mixing vat, then splashed sticky foam everywhere.
8. The villain drained the main reserve, then stole the master beaker.
9. The villain swapped the liter labels, then stole the master beaker.
10. The villain clogged the intake pipe, then dropped a wet measuring cup.
11. The villain clogged the intake pipe, then splashed sticky foam everywhere.
12. The villain drained the main reserve, then dropped a wet measuring cup.

Answer Key

The Great Capacity Caper

Culprit: Walter Water

stream beam · neon dye · right-handed pouring · spiky hair · sponge wipe

Trail: Start 21 → Clue 1 16 → Clue 2 11 → Clue 3 6 → Clue 4 4 → Clue 5 1

Clue 1 (Fractions of a number): "THE CULPRIT DOES NOT USE FIZZ DROPS"

$\frac{1}{6}$ of 138 = 23 (T) · $\frac{1}{4}$ of 124 = 31 (U) · $\frac{3}{4}$ of 52 = 39 (P) · $\frac{3}{8}$ of 56 = 21 (D) · $\frac{1}{6}$ of 30 = 5 (Z) · $\frac{2}{4}$ of 80 = 40 (C) · $\frac{4}{5}$ of 25 = 20 (N) · $\frac{2}{6}$ of 51 = 17 (H) · $\frac{2}{6}$ of 111 = 37 (O) · $\frac{2}{6}$ of 96 = 32 (S) · $\frac{3}{4}$ of 36 = 27 (I) · $\frac{2}{10}$ of 35 = 7 (E) · $\frac{3}{5}$ of 30 = 18 (L) · $\frac{1}{3}$ of 75 = 25 (R) · $\frac{1}{2}$ of 56 = 28 (F)

Clue 2 (Multiplication facts (1-12)): "RIGHT HANDED SPOUT PATTERN ON WALL"

$7 \times 5 = 35$ (R) · $6 \times 9 = 54$ (N) · $10 \times 8 = 80$ (W) · $9 \times 9 = 81$ (P) · $3 \times 12 = 36$ (S) · $2 \times 7 = 14$ (O) · $8 \times 12 = 96$ (H) · $6 \times 3 = 18$ (I) · $4 \times 11 = 44$ (D) · $8 \times 9 = 72$ (G) · $1 \times 1 = 1$ (E) · $6 \times 10 = 60$ (L) · $11 \times 5 = 55$ (A) · $10 \times 1 = 10$ (U) · $6 \times 7 = 42$ (T)

Clue 3 (Rounding): "SPONGE WIPE ERASED THEIR POWER"

Round 2,262 to the nearest hundred = 2300 (S) · Round 2,912 to the nearest hundred = 2900 (P) · Round 4,313 to the nearest hundred = 4300 (I) · Round 134 to the nearest ten = 130 (E) · Round 54 to the nearest ten = 50 (D) · Round 9,135 to the nearest thousand = 9000 (W) · Round 7,384 to the nearest thousand = 7000 (N) · Round 1,748 to the nearest hundred = 1700 (G) · Round 4,738 to the nearest thousand = 5000 (H) · Round 174 to the nearest ten = 170 (O) · Round 29 to the nearest ten = 30 (A) · Round 374 to the nearest ten = 370 (R) · Round 715 to the nearest hundred = 700 (T)

Clue 4 (Order of operations): "SPIKY BRISTLES LEFT AT THE SCENE"

$6 \times 8 - 15 = 33$ (S) · $3 + 5 \times 5 = 28$ (T) · $60 + 4 \times 3 = 72$ (L) · $3 \times 8 - 14 = 10$ (C) · $6 \times 11 - 30 = 36$ (E) · $4 \times 12 - 14 = 34$ (F) · $5 + 2 \times 2 = 9$ (A) · $11 \times 9 - 20 = 79$ (P) · $12 + 9 \times 5 = 57$ (K) · $31 + 5 \times 3 = 46$ (R) · $20 + 2 \times 2 = 24$ (I) · $12 \times 4 - 10 = 38$ (N) · $39 + 7 \times 2 = 53$ (B) · $27 + 2 \times 9 = 45$ (Y) · $9 \times 9 - 23 = 58$ (H)

Clue 5 (Fractions of a number): surviving statement is box 6 → Walter Water

$\frac{1}{6}$ of 48 = 8 · $\frac{7}{8}$ of 8 = 7 · $\frac{2}{8}$ of 44 = 11 · $\frac{3}{4}$ of 12 = 9 · $\frac{1}{8}$ of 8 = 1 · $\frac{5}{10}$ of 8 = 4 · $\frac{3}{4}$ of 16 = 12 · $\frac{2}{4}$ of 10 = 5 · $\frac{2}{5}$ of 25 = 10 · $\frac{1}{10}$ of 30 = 3 · $\frac{5}{10}$ of 4 = 2