

# Must-Know Math: Problem Solving Strategies and Practice for Grades 4-5

## Answer Key

### Page 3

Step 1: (1) the total number of liters; (2) 4 people drink:  $\frac{1}{4}$  liters before, 2 liters during,  $\frac{1}{2}$  liter after.  
 Step 2: (1) exact; (2) multiplication and addition;  
 (3) I'll find the amount they drink at each stage, then add them together.  
 Step 3: 11 liters.

### Pages 4-5

(1) 4 cups of coffee; (2) 1 hour 23 minutes;  
 (3) TLI: need to know how much Eli started with;  
 (4) 40 red chairs; (5) \$27.25; (6) TLI: needs to know how much Josh made last Saturday

### Pages 6-7

## Birthday Bash

Read Zero's Strategy box, then draw pictures to solve these problems about Karly's birthday party. If he can stop sniffing the gifts, Zero will help along the way too.

**1** Karly and her brother Zach decorated their living room with balloons. They taped a balloon to the wall every 3 feet, with one in each corner. How many balloons did they use?  
*Zero says:* First, divide each wall on the drawing into 3-foot sections and draw dots to show where the balloons go. Then count them to find your answer.

**Answer: 22 balloons**

**2** Karly bought 18 party hats for her guests. One-third of them had stripes. Of the hats without stripes, one-third had polka dots, one-sixth were solid blue, and the rest were solid yellow. How many hats were solid yellow?  
*Zero says:* If it were me, I'd start by drawing stripes on one-third of the hats. Then I'd draw polka dots on one-third of the remaining hats. You see where I'm going with this, right?

**Answer: 6 hats**

**Zero's Strategy: Draw a Picture**

Sometimes, drawing a picture can help you solve a math problem. Start by drawing what you know, then use your drawing to help you find what you need to know. Use symbols and keep your drawings simple—the focus here is on solving the problem, not creating a great work of art!

**3** Kymm, Lauren, Jackie, Alanna, and Maggie arrived together. They sat in a row on Karly's big red couch. Jackie sat on the far left. Lauren sat between Maggie and Kymm. Kymm had only one person next to her. List the order of guests on the couch from left to right.  
*Zero says:* The nice people who made this book gave you a picture of the girls and ovals in which to write their names. Use the picture and the clues to figure out which girl is which. (Note: "Left" means left from the point of view of someone looking at the couch, not sitting on it.)

**4** Karly received three posters as gifts. She decided to put them up in her bedroom—immediately. (Her guests had to amuse themselves for a while.) Karly's bedroom wall was 12 feet wide. Each poster was 1 foot wide. She hung the posters side by side so that there was an equal distance between all three posters. The posters on the left and the right were each  $\frac{3}{4}$  feet from the edge of the closest wall. How many feet of space were between each poster?  
*Zero says:* See that big rectangle? It represents Karly's bedroom wall. One of the posters has been drawn to get you started. Draw the other two posters and fill in all the measurements you know from the problem. I know you can figure out the rest!

**Answer: 1 foot**

### Pages 8-9

(1) *Pattern:* AAAPAAAP; *answer:* apple; (2) *Pattern:* M: 223, T: 219, W: 215, Th: 211; F: 207; *answer:* 207 pounds  
 (3) *Pattern:* drawing of 4 trays by 4 trays; *answer:* 11 feet; (4) *Pattern:* 15 pizzas, 90 ounces of cheese; *answer:* 90 ounces

### Pages 10-11

*Note: Correct guesses are shown.*

## Pet Central

Read Zero's Strategy box, then use his "guess and check" strategy to solve the problems about the Brewer family and their pets. Zero will help along the way.

**1** Each of the three kids in the Brewer family has an aquarium with snails. All together, the Brewer kids have 34 snails. Taylor has twice as many snails as Madeline. Anthony has 2 more snails than Madeline. How many snails does each child have?  
*Zero says:* First, list what you know, and what you need to find out. You know:  
 • Madeline has some number of snails.  
 • Taylor has **2X** the number of snails that Madeline has.  
 • Anthony has **2 more than Madeline**.  
 • There are **34 snails** altogether.  
**person has** How many each  
*Next,* take a guess at how many snails Madeline has: **8**.  
 Now check to see if that guess works. You know that Taylor has twice as many snails as Madeline, so Taylor has **16** snails. You know that Anthony has 2 more snails than Madeline, so Anthony has **10** snails.  
 \*Remember that the other 2 kids have more snails than Madeline, so a good guess would be less than  $\frac{1}{3}$  the total number of snails.  
 Combine the three totals:  
 $8 + 16 + 10 = 34$   
 (Madeline's snails) (Taylor's snails) (Anthony's snails)  
 If your answer is not 34, try again with a higher or lower guess for Madeline's snails.  
**Answer: M=8 T=16 A=10**

**2** The Brewers spent \$28 buying new toys for their cats and dogs. Dog toys cost \$6 each and cat toys cost \$5 each. How many of each type of toy did the Brewers buy?  
*Zero says:* First, take a guess at how many dog toys they bought: **3**.  
 Now check to see if that answer works. Figure out how much money it would cost to buy that number of dog toys:  
 $3 \times \$6 = \$18$   
 (your guess) (price of 1 dog toy)  
 Subtract that amount from the total the Brewers spent:  
 $\$28 - \$18 = \$10$   
 (total spent) (price of dog toys)  
 Is what's left divisible by the price of one cat toy? If so, divide to find the number of cat toys they bought. If not, start again with a new guess for the dog toys.  
**Answer: 3 dog toys, 2 cats toys**

**Zero's Strategy: Guess and Check**

If you're not sure how to get started on a problem, start with a reasonable guess. Plug your guess into the problem, solve, and see how it turns out. If a higher or lower guess would work better, try the problem again, adjusting the guess as needed.

**3** The Brewers have 10 pets with legs. Some have 4 legs, some have 2 legs (and feathers), and one dog has 3 legs. (Don't worry—Franklin does just fine that way.) All together, the animals have 35 legs. How many animals with 4 legs and how many animals with 2 legs do the Brewers have?  
*Zero says:* First, guess how many animals with 4 legs they have. Multiply to find the number of legs those animals would have.  
 $7 \times 4 = 28$   
 Don't forget Franklin! Add 3 to your answer.  
 $28 + 3 = 31$   
 Subtract the sum from the total number of legs.  
 $35 - 31 = 4$   
 Is the difference divisible by 2? If not, start over with another guess. If it is, divide to find the number of animals with 2 legs. To check your answer, add the number of animals with 2 legs, 4 legs, and 3 legs. If it does not equal 10, try another guess.  
**Answer: 7 with 4 legs, 2 with 2 legs**

**4** Here are the weights of the Brewers' four dogs: Olive weighs 72.4 pounds, Gobin weighs 18.5 pounds, Franklin weighs 38.7 pounds, and Doris weighs 22.3 pounds. On Saturday, three of the dogs piled into the car with Mrs. Brewer and the kids. The fourth dog stayed home to keep Mr. Brewer company. The total weight of the dogs that went with Mrs. Brewer was 129.7 pounds. Which dog stayed home?  
*Zero says:* Before guessing which dog stayed home, I suggest you round each dog's weight to the nearest 10 pounds and estimate the total weight of all four dogs:  
 $70\text{lbs} + 20\text{lbs} + 40\text{lbs} + 20\text{lbs} = 150\text{lbs}$   
 Now round to the nearest 10 the combined weight of the three dogs that went in the car:  
 $130\text{lbs}$   
 Now find the difference between the estimated weight of all four dogs and the rounded weight of the three that went. Find a dog that weighs about that much. Got your guess? Add up the exact weights of the other three and check to see if it is 129.7 pounds. If not, not another guess.  
**Answer: Doris**

## Pages 12-13

- (1) List: KGC, KCG, CKG, CGK; answer: 6 different ways;  
 (2) List: crystal ball  $\approx$  \$35 each, mouse brain  $\approx$  \$15 each, bracelet  $\approx$  \$20 each, moon box  $\approx$  \$55; answer: 2 crystal balls, or 1 crystal ball and 1 mouse brain and 1 bracelet, or 1 moon box and 1 mouse brain; (3) List: ABCEF, ABDEF, ACDEF, BCDEF; answer: 6 different groups;  
 (4) List: AB, AC, AD, AE, BC, BD, BE, CD, CE, DE; answer: 10 combinations; (5) List: 1. 1 five + 1 ten; 2. 3 fives; 3. 1 ten + 5 ones; 4. 2 fives + 5 ones; 5. 1 five + ten ones; 6. 15 ones; answer: 6 combinations

## Pages 14-15

Duncan's age	Ailie's age
3	19
4	20
5	21
6	22
7	23
8	24
<b>8 years old</b>	

Catches	Tally	Frequency
0-3	IIII	5
4-7	IIII III	8
8-11	I	1
more than 11	I	1
Most of the teams had <b>4-7</b> successful catches		

Months	Scarves made by Granny Magoon	Scarves made by Granny Fergus
0	12	18
1	15	20
2	18	22
3	21	24
4	24	26
5	27	28
6	30	30
7		
8		
<b>6 months</b>		

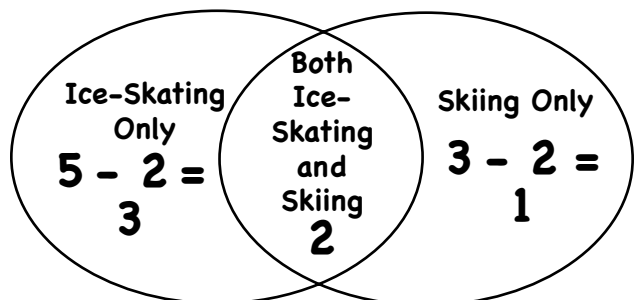
Sugar (cups)	Flour (cups)
$\frac{1}{2}$	3
1	6
$1\frac{1}{2}$	9
2	12
$2\frac{1}{2}$	15
<b><math>2\frac{1}{2}</math> cups</b>	

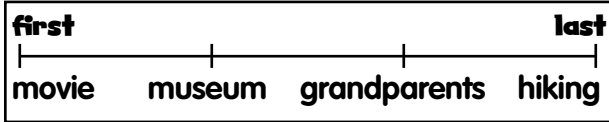
Week	Amount Saved
1	\$1
2	\$2
3	\$4
4	\$8
5	\$16
6	\$32
7	\$64
<b>7 weeks</b>	

## Pages 16-17

	Train	Boat	Car	Plane
Lara	X	X	✓	X
Trevor	X	✓	X	X
Jeremy	✓	X	X	X
Danielle	X	X	X	✓

Lara traveled by **car**.  
 Trevor traveled by **boat**.  
 Jeremy traveled by **train**.  
 Danielle traveled by **plane**.





**127 - 13 = 114**  
**114 ÷ 2 = 57**  
**57 + 13 = 70**  
**Kristin: 57 pictures**  
**Valerie: 70 pictures**

### Pages 18-19

- (1)** Leaving: June 22; packing: June 21; shopping: June 6;  
**(2)** Equation:  $7 + 3 = 10$ ; answer: 20 slugs;  
**(3)** 6:35 p.m.; **(4)** 3.3 miles;  
**(5)** Step 1:  $3 \text{ oz} + 1 \text{ oz} = 4 \text{ oz}$ ; answer: 6 oz

### Pages 20-21

- (1)** 7:45 a.m.; **(2)** 6 orders;  
**(3)** 8 steps forward, 1 step to the left;  
**(4)** Answer from top to bottom: 1 person, 3 people, 1 person; **(5)** 3 custards, 2 lemonades;  
**(6)** 1,200 more riders; **(7)** 1-3 times;  
**(8)** T-shirt, mug, poster

### Pages 22-23

- (1)** 25 pint-size boxes, 16 quart-size boxes;  
**(2)** 1 quart and 1 pint; **(3)** \$8.85; **(4)**  $\frac{1}{4}$  lb;  
**(5)** TLI: need the price of the scones;  
**(6)** Answers from top to bottom: black dog, white dog, gray dog, red dog; **(7)** 4 stacks of 2 bars; **(8)** \$2.80 less

### Pages 24-25

- (1)** Dad: bicycle, Mom: boat, Carl: metro, Grace: taxi;  
**(2)** 21 cups; **(3)** 4 people; **(4)** mini French flag;  
**(5)** Venus de Milo; **(6)** 10 possibilities; **(7)** 19 snails;  
**(8)** 29,133 miles

### Pages 26-27

- (1)** 4 laps; **(2)** \$79.00; **(3)**  $4\frac{1}{4}$  miles; **(4)** \$48.00;  
**(5)** Kristin: 17 laps, Gina: 19 laps; **(6)** He collected the same amount from both aunts;  
**(7)** Li-Mei: 16 laps, Yu: 18 laps; **(8)**

Whole class	Girls	Boys
Range: <b>10</b>	Range: <b>10</b>	Range: <b>9</b>
Mode: <b>17</b>	Mode: <b>17</b>	Mode: <b>16</b>
Median: <b>16</b>	Median: <b>16</b>	Median: <b>15.5 (15½)</b>
Mean: <b>14.45 (14<math>\frac{9}{20}</math>)</b>	Mean: <b>13.18 (13<math>\frac{9}{50}</math>)</b>	Mean: <b>16</b>

### Pages 28-29

- (1)** 6 different orders; **(2)** Answers from top to bottom: peach cobbler, fried shrimp, walleye-pike;  
**(3)** 290 brownies; **(4)** 5 sticks; **(5)** 58 new foods;  
**(6)** 1,742 sticks; **(7)** 44 sticks of corn; **(8)** Nell

### Pages 30-31

- (1)** 126 dust bunnies; **(2)** TLI: need to know how many mugs he has in all; **(3)** Alaska; **(4)** 134 rubber insects;  
**(5)** a. 168 inches; b. 816 wrappers; **(6)** 2 hippos;  
**(7)** 48 glass eyeballs; **(8)** 35 issues