


## How to use Z-kai Zoom-Up Workbook

- 1 This Zoom-Up Workbook contains 45 problem sets. We recommend that you solve problems starting with the first problem set (Problem 01) in the workbook. The problems are challenging, so please take your time and don't easily give up on finding the solutions. It might take you a few days to solve each problem set.
- 2 After you finish one problem set, check your answers by referring to the pages in the “Answers and Solutions” section at the back of the workbook.
- 3 If an answer is wrong, carefully read the section “How to Think and Solve” before reviewing your solution process. It is a good idea not to erase any mistakes in your work. Instead, use a different colored pen or pencil to make corrections and/or make notes to explain your mistakes and how you corrected your thinking. By doing this, you will more clearly understand and remember the mathematics needed to solve the problem(s).
- 4 In each section titled **If you can solve this, the math-and-you-are cool!** or **It's awesome if you know!**, you will find useful information that will help you understand and increase your learning.
- 5 The problems marked with the thumbs-up symbol  are very challenging problems. When you figure out how to solve these problems, you should be very proud of your achievement.

### Dear Parents, Dear Teachers,


The Z-kai Zoom-Up Workbook is designed for students to be able to work independently. The workbook provides an “Answers and Solutions” section that gives detailed explanations about how to think about and understand solutions to challenging problems. To develop good habits for learning mathematics' problem solving, we recommend that students check and compare their answers and solution process to the material in “Answers and Solutions.” We also encourage parents and teachers to read the explanations together with students, especially since reading and comprehending explanations is challenging for all students, at least some of the time.

Since everyone should learn to enjoy the challenge of thinking about and solving challenging problems ... let's solve challenging problems together!



## Z-kai Zoom-Up Workbook Math Grade 4

	<b>Check!</b>
<b>1</b> Approximate Numbers .....	6 <input checked="" type="checkbox"/>
<b>2</b> Math in the TV News .....	10 <input type="checkbox"/>
<b>3</b> Math Sentences and Calculations .....	12 <input type="checkbox"/>
<b>4</b> Multiplication and Large Number Problems .....	14 <input type="checkbox"/>
<b>5</b> Calendar Math and Division (Part 1) .....	16 <input type="checkbox"/>
<b>6</b> Calendar Math and Division (Part 2) .....	18 <input type="checkbox"/>
<b>7</b> Visiting Grandparents in Japan .....	20 <input type="checkbox"/>
<b>8</b> Divisible or Indivisible? (Part 1) .....	22 <input type="checkbox"/>
<b>9</b> Divisible or Indivisible? (Part 2) .....	24 <input type="checkbox"/>
<b>10</b> Division Algorithm (Part 1) .....	26 <input type="checkbox"/>
<b>11</b> Division Algorithm (Part 2) .....	28 <input type="checkbox"/>
<b>12</b> Let's Get Started with Some Challenging Math! .....	30 <input type="checkbox"/>
<b>13</b> Investigating Our Heights! .....	32 <input type="checkbox"/>
<b>14</b> The Mathematics of Calendars (Part 1) .....	34 <input type="checkbox"/>
<b>15</b> The Mathematics of Calendars (Part 2) .....	36 <input type="checkbox"/>
<b>16</b> The Secrets of One-Stroke Sketching (Part 1) .....	38 <input type="checkbox"/>
<b>17</b> The Secrets of One-Stroke Sketching (Part 2) .....	40 <input type="checkbox"/>
<b>18</b> Let's Go Shopping (Part 1) .....	42 <input type="checkbox"/>
<b>19</b> Let's Go Shopping (Part 2) .....	44 <input type="checkbox"/>
<b>20</b> How to Keep Score in Bowling (Part 1) .....	46 <input type="checkbox"/>
<b>21</b> How to Keep Score in Bowling (Part 2) .....	48 <input type="checkbox"/>
<b>22</b> Field Trip to the Botanical Garden (Part 1) .....	50 <input type="checkbox"/>

<b>23</b>	Field Trip to the Botanical Garden (Part 2) .....	52	<input type="checkbox"/>
<b>24</b>	Birthday Party .....	54	<input type="checkbox"/>
<b>25</b>	Autumn Sports (Part 1) .....	56	<input type="checkbox"/>
<b>26</b>	Autumn Sports (Part 2) .....	58	<input type="checkbox"/>
<b>27</b>	Mystery of Whole Numbers .....	60	<input type="checkbox"/>
<b>28</b>	<i>Amida-kuji</i> (Amida Lottery) (Part 1) .....	62	<input type="checkbox"/>
<b>29</b>	<i>Amida-kuji</i> (Amida Lottery) (Part 2) .....	66	<input type="checkbox"/>
<b>30</b>	Line Segment Diagrams (Part 1) .....	68	<input type="checkbox"/>
<b>31</b>	Line Segment Diagrams (Part 2) .....	70	<input type="checkbox"/>
<b>32</b>	Fractions (Part 1) .....	72	<input type="checkbox"/>
<b>33</b>	Fractions (Part2) .....	74	<input type="checkbox"/>
<b>34</b>	Fractions (Part3) .....	76	<input type="checkbox"/>
<b>35</b>	Addition and Subtraction of Fractions .....	80	<input type="checkbox"/>
<b>36</b>	Decimal Numbers .....	82	<input type="checkbox"/>
<b>37</b>	Aim to be a Calculation Champion! .....	84	<input type="checkbox"/>
<b>38</b>	Secrets of a Pair of Set Squares (Part 1) .....	86	<input type="checkbox"/>
<b>39</b>	Angles .....	88	<input type="checkbox"/>
<b>40</b>	Secrets of a Pair of Set Squares (Part 2) .....	90	<input type="checkbox"/>
<b>41</b>	Solving Problems Using Area Diagrams .....	92	<input type="checkbox"/>
<b>42</b>	National Flag Patterns (Part 1) .....	94	<input type="checkbox"/>
<b>43</b>	National Flag Patterns (Part 2) .....	96	<input type="checkbox"/>
<b>44</b>	Cube Puzzles (Part1) .....	98	<input type="checkbox"/>
<b>45</b>	Cube Puzzles (Part2) .....	100	<input type="checkbox"/>
	Answers and Solutions .....	103	



# 24

## Birthday Party

Date	
Score	100

- 1 Today is Kimberly's birthday. Her friend Miles is telling her a math problem about age. She is becoming very curious.

Kimberly: Today is my birthday. I'm 10 years old now!

Miles: Happy birthday! This is a birthday gift for you. It is a stuffed cat.

Kimberly: Thank you, Miles.

Miles: My grandmother taught me a way to use math to find someone's age. I'll tell you how it's done. How old is your father?

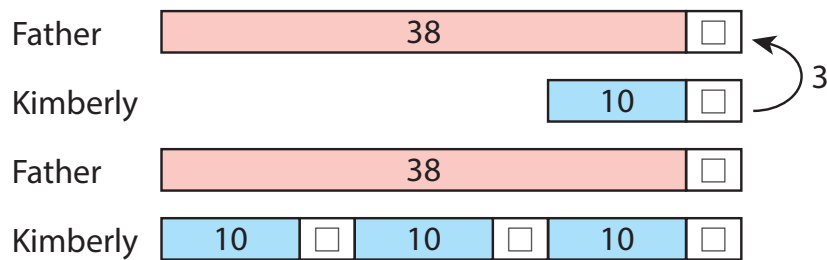
Kimberly: He is 38 years old.

Miles: How many years from now will it be when your father's age will be three times as much as your age? If you use a tape diagram to represent the ages of your father and you, you can find out. See, I drew a tape diagram for you! It is really fun to think about this problem and the diagram will help us solve it.

Kimberly: Okay, I will try my best.



The numbers shown in the tape strips represent the age of each person. The  in the tapes show the number of additional years.



- A Using the tape diagram above, find how many years it will take for Kimberly's father's age to be three times as much as her age.  
(15 points for the math sentence, 15 points for the answer)

Math Sentence

Answer ( )

24 Birthday Party

Answers

1

A **Math Sentence:**  $10 \times 3 = 30$   
 $38 - 30 = 8$   
 $8 \div 2 = 4$

Answer: 4 years later

B **Math Sentence:**  $10 \times 2 = 20$   
 $38 - 20 = 18$

Answer: 18 years later

C **Math Sentence:**  $38 - 10 = 28$   
 $28 \div 4 = 7$   
 $10 - 7 = 3$

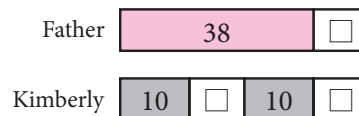
Answer: 3 years ago

How to Think and Solve

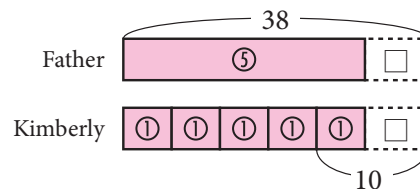
1 This problem involves visually representing people's ages and calculating to answer questions related to their ages.

A Using the diagrams created by Miles, we can see that the sum of three units of ten and two units of  $\square$  is equal to 38.

B If we draw the diagram below, we can see that the sum of two units of 10 and a  $\square$  is equal to 38.



C Let Kimberly's age of  $\square$  years ago be represented as " $10 - \square$  (age)." Then we make  $\textcircled{1}$  a space that represents  $10 - \square$ . To help you solve this problem, draw a diagram like the one below.



$38 - 10 = 28$   
 $28 \div 4 = 7$   
 So,  $\textcircled{1}$  is 7.  
 The  $\square$  is:  
 $\square = 10 - 7 = 3$