Chapter 13 Addition and Subtraction Within 40

	Lesson	Page	Objectives
	Chapter Opener	44	
1	Add Ones	45	Add a one-digit number and a two-digit number when there is no regrouping.
2	Subtract Ones	46	Subtract a one-digit number from a two-digit number when there is no regrouping.
3	Make the Next Ten	47	Add a one-digit number and a two-digit number when there is regrouping by making the next ten.
4	Use Addition Facts	48	Add a one-digit number and a two-digit number when there is regrouping by adding the ones and then the tens.
5	Subtract from Tens	49	Subtract a one-digit number from a two-digit number by first subtracting the ones from the tens.
6	Use Subtraction Facts	50	Subtract a one-digit number from a two-digit number by first regrouping the tens and ones into 1 less ten and 11–19 ones.
7	Add Three Numbers	51	Find the value of addition expressions with three addends.
8	Practice	52	

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Materials

Materials

- Counters
- Linking cubes in tens and ones

Optional

- Base-ten blocks (ones and ten-rods)
- Playing cards

Printouts

(singaporemath.com/higprintouts)

- Number Cards 0–100 (use 0–40)

Mental Math Sheets

(singaporemath.com/higprintouts)

Mental Math		After Lesson
10	Add one-digit and two-digit number, no regrouping	1
11	Subtract one-digit from two-digit number , no regrouping	2
12	Add or subtract, no regrouping	2
13	Add one-digit and two-digit number with regrouping	3
14	Add one-digit and two-digit number with regrouping	4
15	Add one-digit and two-digit number	4
16	Subtract one-digit from two-digit number with regrouping	5
17	Subtract one-digit from two-digit number with regrouping	6
18	Subtract one-digit from two-digit number	6
19	Add or subtract	6
20	Add or subtract	6
21	Add 3 numbers	7

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Notes

In this chapter, students will add a one-digit number and a two-digit number, or subtract a one-digit number from a two-digit number, using strategies based on the structure of numbers (tens and ones). These strategies build on strategies they learned for adding and subtracting within 20.

Students will not be writing complex equations like any in these notes. They are there for your benefit to help you understand the strategies.

For addition, students will first need to recognize whether adding the ones gives a sum less than ten before calculating. If it does, we can find the sum of the two numbers by simply adding the ones.

$$23 + 5 = 20 + (3 + 5) = 20 + 8 = 28$$

If adding the ones will give a sum greater than nine, one strategy is to make the next ten, usually by splitting the one-digit number:

$$25 + 8 = (25 + 5) + 3 = 30 + 3 = 33$$

Another strategy is to first add the ones, whether by rote memorization of the fact or a quick "make a ten" calculation. The answer will have another ten.

$$25 + 8 = 20 + 13 = 33$$

This resembles the traditional addition algorithm in that they are adding ones first, and then tens, but students will not be writing the numbers "stacked" and doing a paper and pencil addition algorithm until Dimensions Math® 2. Being able to add and subtract two-digit numbers mentally will help with number sense, estimation, and other mental math strategies they will learn later.

"Mental math" is not just coming up with a final answer before writing anything down. Think of it more as "speed math," or calculating without using the algorithm. Some students could "look ahead," see that there will be one more ten, write 3, and then figure out what the ones will be, either from having memorized the fact or thinking about what is left after making a ten.

For subtraction, students will first need to recognize whether regrouping is needed to subtract the ones, which can be determined by simply seeing if the ones of the two-digit number is greater or less than the one-digit number. If regrouping is not needed, we can find the difference by simply subtracting the ones.

$$38 - 5 = 30 + (8 - 5) = 30 + 3 = 33$$

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If regrouping is needed, one strategy is to subtract from the tens. This can be done by subtracting from the tens of the ten digit number directly:

$$35 - 8 = (30 - 8) + 5 = 22 + 5 = 27$$

30 5

Alternately, it can be done by subtracting from 1 ten:

$$35 - 8 = 25 + (10 - 8) = 25 + 2 = 27$$

25 10

Another strategy is to split the two-digit number into one less ten and a number from 11–19, and then subtract the one-digit number from that, whether by having the subtraction fact memorized or by quickly computing it mentally.

$$35 - 8 = 20 + (15 - 8) = 20 + 7 = 27$$

20 15

This again resembles the traditional subtraction algorithm students will use with three-digit numbers in Dimensions Math® 2. Again, some students might "look ahead", know there will be one less ten, write down the 2 for 2 tens, figure out what the ones will be, and write that down.

Students will see the number bonds showing how to split one of the numbers when first learning about a strategy. They can write the two parts below the number they are "splitting" initially if they need to, but they should eventually be able to find the answer without that step.

Students can come up with their own strategies, such as splitting the one-digit number similar to a strategy they learned when subtracting within 20:

$$35 - 8 = 35 - 5 - 3 = 30 - 3 = 27$$

5 3

This strategy could also be done by simply finding the difference between the ones of both numbers and subtract that from the ten. (For example, for 35 – 8, the difference between 5 and 8 is 3, subtract 3 from 30.)

All of these strategies are simply splitting one number to make the calculations easier, and then doing two calculations. For addition, both strategies involve splitting one of the addends and then adding twice. For subtraction, if the first number is split, all of the second number is subtracted from one of those parts, and the other part has to be added back in. If the second number is split and part of it is subtracted, the other part has to be subtracted in the next step.

Students may come up with other strategies that don't involve splitting one of the numbers. The more problems they do, the more likely they will start to see patterns and possibly use a different strategy.

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For example, they could subtract 9 by subtracting 10 and adding 1.

Don't let your student become overwhelmed by the different strategies, or let yourself feel overwhelmed by them and think they are not necessary because you may not have learned them yourself. Your student should understand the different strategies, and might simply adopt one strategy as being the easiest and use it all the time. Or, your student might experiment with different strategies under different circumstances, such as "using math facts" when they remember them, but making the next ten when they do not. Flexibility with numbers is important in laying a good foundation for future math studies.

In the last lesson in the chapter, students will find the sum for expressions with 3 addends, such as 9 + 5 + 8, and see that they can add them in any order. In the next chapter, they will be finding the sum in expressions with more than three addends, but all the addends will be the same number. (This will be an introduction to multiplication, which will be covered more in Dimensions Math® 2).

You can use the mental math sheets to provide more practice at any time after the appropriate lesson. Try to encourage speed and discourage counting on fingers by timing your student, if that helps and does not frustrate them.

Games

- After Lesson 4 for addition or after Lesson 6 for subtraction.
  Materials: Two sets of number cards 11–28, four sets of number cards 1–9
  Purpose: Add (or subtract) within 40.
  Goal: Get the most cards.
  Procedure: Shuffle the two sets of cards separately and deal all of them out. Players keep their cards face down in two piles. Each player turns over one card from each pile and finds the sum. The player with the greatest sum gets all the cards. If more than one player has the same sum, they each turn over another card to see who wins the round.
  Variation: Each player finds the difference between the two cards. The player with the least difference gets all the cards.
  Variation: Players take turns turning over their cards. The player that finds the sum (or difference) first gets both cards.

- After Lesson 7
  Materials: Four (or more) sets of number cards 1–10, or playing cards ace–10
  Purpose: Add 3 numbers, within 40.
  Goal: Get the most cards.
  Procedure: Shuffle cards and deal all of them out. Players keep their cards face down. Each player turns over three cards and finds the sum. The player with the greatest sum gets all the cards. If more than one player has the same sum, they each turn over another card to see who wins the round.

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Chapter 13 Workbook Answers

Exercise 1 pp. 41–42

❶ 8
18
28
38

❷ 26 39

❸ 37 25
29 38

9 6 8
19 26 38

9 7 3
39 27 33

❹ (a) 34 (b) 27 (c) 18
(d) 29 (e) 3 (f) 24

Exercise 2 pp. 43–44

❶ 6
16
26
36

❷ 24 32

❸ 24 35
33 28

4 3 5
34 13 25

2 4 1
22 34 11

❹ (a) 21 (b) 35 (c) 12
(d) 32 (e) 3 (f) 2

Exercise 3 pp. 45–48

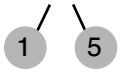
The number bonds are included to encourage students to use the strategy taught in this lesson. They should understand this strategy and be able to use it, so they should fill in the number bonds correctly. They can use any strategy for ❻, ideally not counting up on fingers.

❶ (a) 20
24
(b) 30
32
(c) 30
34

❷ 31 23
23 32
35 32
22 25

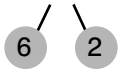
❸ (a) 9 (b) 2 (c) 7
(d) 5 (e) 8 (f) 4
(g) 1 (h) 3 (i) 6

❹ (a) 19 + 6 = 20 + **5**



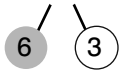
19 + 6 = **25**

(b) 8 + 28 = **6** + 30



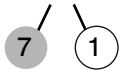
8 + 28 = **36**

(c) 14 + 9 = 20 + **3**



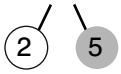
14 + 9 = **23**

(d) 23 + 8 = 30 + **1**



23 + 8 = **31**

(e) 7 + 25 = **2** + 30



7 + 25 = **32**

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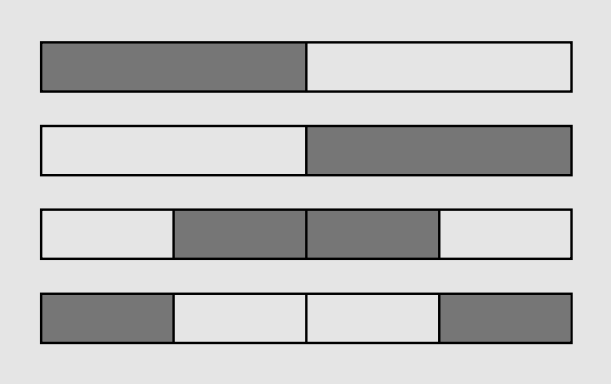
Lesson 3 Practice (p. 89)

This practice is short. You can add the enrichment, or spend extra time having your student practice math facts and mental math strategies.

Do the following activity as part of the lesson.

Use the **Halves** printout. Ask your student to color one half of each strip by coloring the marked rectangles. Each strip needs to have a different part colored. Help your student realize that the colored part does not have to be the first part, and that if two shaded parts can be rearranged and joined together to form a part equivalent to a half, then together they are a half of the strip. Imagining a figure with parts of it rearranged is a good problem solving tool that students will use later.



❸ Until now, all "cuts" to divide a shape into equal parts have been straight lines. Your students should be able to see that the two parts of D are equal. However, you can use the first part of the **Equal Parts** printout, which has the same figure enlarged, and cut apart the two halves so your student can put one half on top of the other.

Answers

❶ (a) 1
(b) 2

❷ (a) 1
(b) 4

❸ A, D

❹ A, C

Enrichment

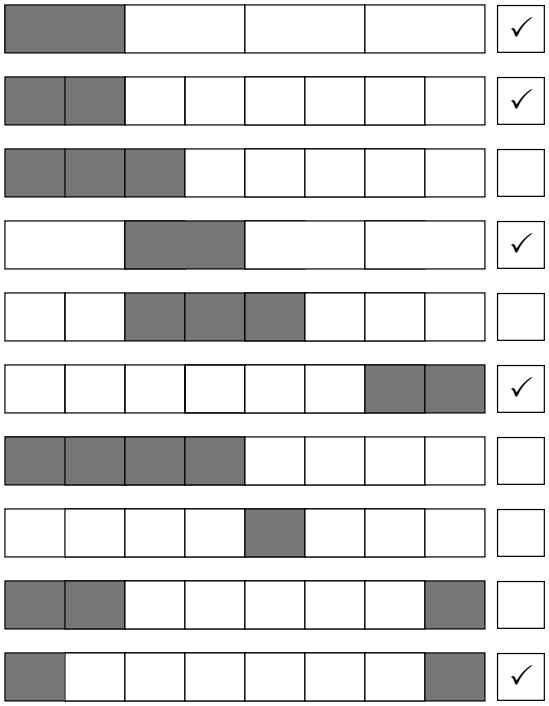
- Have your student do the **Equal Parts** printout.
- You can tell your student that when a shape is split into three equal parts, each part is a third, and have your student try to fold and cut some shapes, such as strips of paper or hexagons, into thirds. You can also tell your student that when a shape is cut into six equal parts, each part is a sixth. (Your student might see an analogy with ordinal numbers after second: third, fourth, etc.) If you have pattern blocks, have your student identify what shape each block is half of, a third of, or a sixth of. For example the red trapezoid is half of the hexagon, or the green triangle is a sixth of the yellow hexagon.

SAMPLE

Chapter 15 Workbook Answers

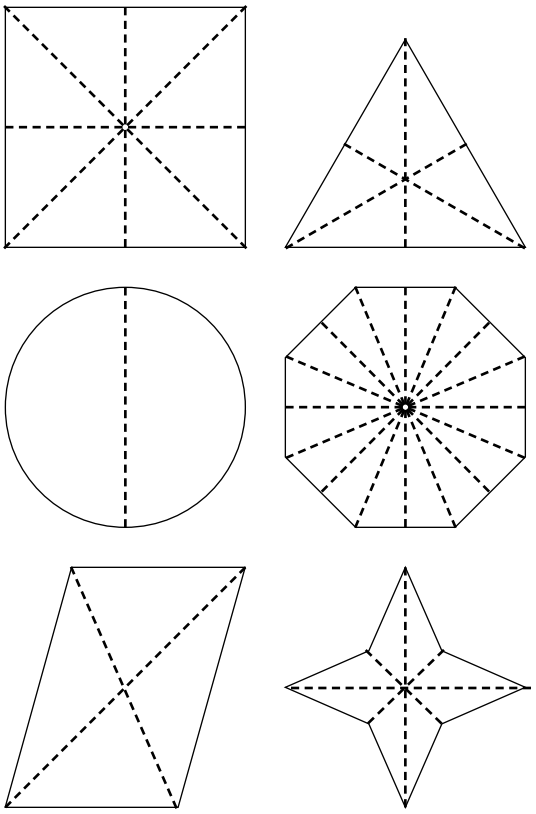
Exercise 3 pp. 89–92

1

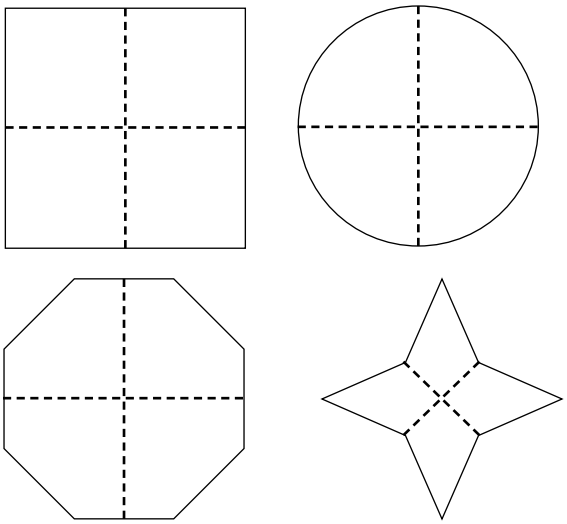


For each of these, the size of the shaded part needs to be the same for 1 fourth to be shaded. Students can compare the sizes to the size in the first bar. They could note that two units in the second bar is the same size as one unit in the first bar. All of the bars have units of the same size as the first or second bar. For the last two bars, if needed, you can suggest your student think of rearranging the shaded parts to match the first three bars. Or, students can simply realize that when there are eight equal parts, two parts is one fourth.

2 Possible answers are shown, except for the circle, which has many possible answers. Students should have drawn only one of these possible lines.



3 Answers may vary; only one is shown for each figure here.



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Chapter 15 Workbook Answers

4 (a) 

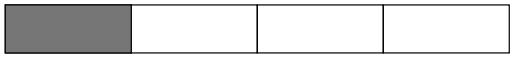
(b) 

5 Answers can vary. Students can color either half of the first bar, and any five units in the second bar.

(a) 

(b) 

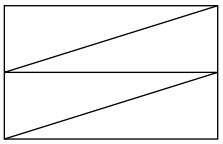
6 Answers can vary. Students can color any of the fourths in the first bar, and any three units in the second bar.

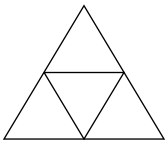
(a) 

(b) 

7 

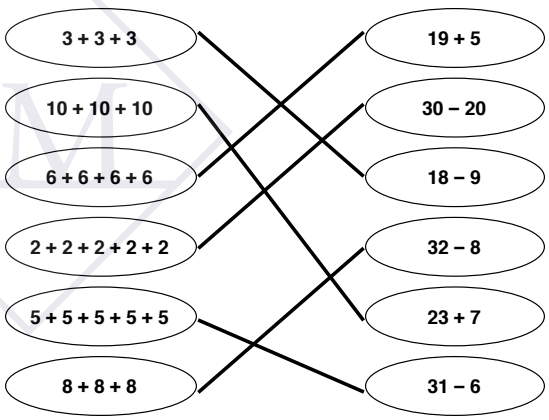
8 Answers can vary.





Exercise 4 pp. 93–96

1



2 (a) thirty-nine | twenty | twenty-five | ~~sixteen~~

(b) 32 – 7 | 27 + 8 | ~~25 – 6~~ | 40 – 20

(c) 3 tens 2 ones | ~~23 ones~~ | 3 tens | 4 groups of 10

3 A: 4 units
B: 12 units
C: 5 units
D: 8 units
E: 9 units

(a) B

(b) A

(c) 9 – 5 = 4
4

(d) 12 – 4 = 8
8

(e) 5 + 8 + 9 = 22
22

4 (a) The 5th circle 

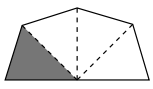
The 7th circle 

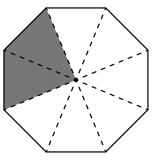
The 10th circle 

(b) 4 circles

If your student finds some of this problem challenging, remind them they can draw a picture, so they can make a sketch of the next 4 circles and shade half of each, if needed.

5 Exactly which parts are shaded can vary.

(a) 

(b) 

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