

CHAPTER

3

Number Relationships

Vocabulary:

operation
inverse operation

Chapter Outcomes:

- Solve problems involving number sentences with one unknown.



Equality is all about sameness. Number sentences allow you to use the equal sign to show the relationship that exists between expressions of equal value. The equal sign makes it possible for number sentences to be changed and rearranged, so that you can find new ways of expressing equality and find unknowns.

Equality can be found in the natural world. Each flower on the Frangipani plant has equal number of petals.

Getting Ready for Chapter 3

Write $>$, $<$ or $=$ in the circle.

1. $45 \bigcirc 24$
2. $4 + 3 \bigcirc 8$
3. $12 - 2 \bigcirc 6 + 4$
4. $9 + 7 \bigcirc 11 + 6$

Find the missing number.

5. $8 + \square = 11$
6. $7 - \square = 5$
7. $18 \div \square = 6$
8. $10 \times \square = 20$

Complete the number sentences.

9. $11 + 6 - 6 =$
10. $12 - 4 + 2 =$
11. $8 + 6 - 10 =$

Complete the number pattern.

12. 9, 14, 19, $\square$
13. 32, 26, 20, $\square$

Use Inverse Operations to Find Missing Numbers

Teaching Point 1:

How can I use inverse operations to find missing numbers?

Using the inverse operation to calculate missing values in a number sentence.

Subtraction is the **inverse** of Addition

$$6 + 5 = 11$$

$$11 - 6 = 5 \text{ or } 11 - 5 = 6$$

Complete the number sentence.

$$23 + \square = 48$$

$$48 - 23 = 25 \text{ So, } 23 + 25 = 48.$$

Division is the **inverse** of Multiplication

$$9 \times 5 = 45$$

$$45 \div 9 = 5 \text{ or } 45 \div 5 = 9$$

Complete the number sentence.

$$\square \div 4 = 25$$

$$25 \times 4 = 100 \text{ So, } 100 \div 4 = 25.$$

Activity 1:

Use inverse operations to complete the number sentences.

1. $37 + \square = 57$
2. $45 + \square = 100$
3. $\square + 23 = 68$
4. $\square + 78 = 120$
5. $87 - \square = 27$
6. $145 - \square = 100$

7. $\square - 23 = 40$ 8. $\square - 24 = 78$
9. $15 \times \square = 45$ 10. $25 \times \square = 125$
11. $\square \times 10 = 680$ 12. $\square \times 8 = 720$
13. $250 \div \square = 10$ 14. $132 \div \square = 12$
15. $\square \div 9 = 32$ 16. $\square \div 7 = 53$
17. $75 \div \square = 15$ 18. $64 \times \square = 192$
19. $\square + 58 = 95$ 20. $\square - 17 = 23$

Use Relational Thinking to Find Missing Numbers

Teaching Point 1:

How can number relationships help me find the missing number?

$$63 + 45 = 47 + \square ?$$

How does the 45 compare to 47? So, how will the missing number compare to 63?

47 is 2 more than 45.

$$63 + 45 = 47 + \square$$

+2
-2

I need a number that is 2 less than 63.

So, the number that goes in the box is 61.

$$63 + 45 = 47 + 61$$

Activity 1:

Find the missing number without calculating.

1. $25 + 35 = 20 + \square$
2. $18 + 56 = 58 + \square$
3. $41 + \square = 19 + 47$
4. $67 + \square = 49 + 70$
5. $26 + 17 = \square + 23$
6. $240 + \square = 250 + 32$
7. $155 + 28 = \square + 150$
8. $309 + 23 = 32 + \square$
9. $15 + \square = 416 + 11$
10. $637 + 47 = \square + 630$

Teaching Point 2:

How can number relationships help me find the missing number?

$$60 - 29 = 69 - \square ?$$

How does the 60 compare to 69? So, how will the 29 compare to missing number?

69 is 9 more than 60.

$$60 - 29 = 69 - \square$$

+9
+9

I need a number that is 9 more than 29.

So, the number that goes in the box is 38.

$$60 - 29 = 69 - 38$$

Activity 2:

Find the missing number without calculating.

1. $65 - 35 = 69 - \square$
2. $47 - \square = 50 - 35$
3. $\square - 12 = 36 - 9$
4. $78 - 15 = \square - 22$
5. $90 - 29 = 99 - \square$
6. $83 - \square = 76 - 18$
7. $\square - 40 = 67 - 35$
8. $146 - 34 = \square - 39$
9. $372 - 11 = 370 - \square$
10. $249 - \square = 250 - 60$

Activity 3:

Find the missing number without calculating.

1. $12 \times 3 = 4 \times \square$
2. $9 \times \square = 3 \times 6$
3. $\square \times 5 = 4 \times 10$
4. $6 \times 12 = \square \times 24$
5. $24 \times 6 = 8 \times \square$
6. $30 \times \square = 10 \times 15$
7. $\square \times 8 = 7 \times 24$
8. $108 \times 9 = \square \times 81$
9. $99 \times 7 = 9 \times \square$
10. $132 \times \square = 12 \times 66$

Teaching Point 3:

How can number relationships help me find the missing number?

$$12 \times 2 = 4 \times \square ?$$

How does the 12 compare to 4? So, how will the 2 compare to missing number?

4 is 3 times less than 12.

$$12 \times 2 = 4 \times \square$$

I need a number that is 3 times more than 2.

So, the number that goes in the box is 6.

$$12 \times 2 = 4 \times 6$$

Teaching Point 4:

How can number relationships help me find the missing number?

$$12 \div 2 = 24 \div \square ?$$

How does the 12 compare to 24? So, how will the 2 compare to missing number?

24 is 2 times 12.

$$12 \div 2 = 24 \div \square$$

I need a number that is 2 times 2.

So, the number that goes in the box is 4.

$$12 \div 2 = 24 \div 4$$

Activity 4:

Find the missing number without calculating.

1. $8 \div 2 = 24 \div \square$
2. $24 \div \square = 48 \div 6$
3. $\square \div 4 = 32 \div 8$
4. $30 \div 3 = \square \div 9$
5. $60 \div 15 = 20 \div \square$
6. $40 \div \square = 80 \div 16$
7. $\square \div 6 = 60 \div 30$
8. $48 \div 8 = \square \div 16$
9. $14 \div 7 = 42 \div \square$
10. $50 \div \square = 200 \div 40$

Activity 5:

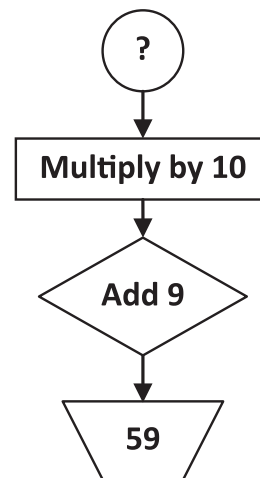
Write the number sentence for each problem below. Solve the problem.

1. Farmer Jones sold 256 mangoes on Monday. He sold some more mangoes on Tuesday. If on both days he sold 402 mangoes, how many mangoes did he sell on Tuesday?



2. There were some books on a shelf in the library. After 17 more books were stacked on the shelf, there were 55 books. How many books were on the shelf at first?

3. Every two weeks, Mr. Job mows a total of 47 lawns. After one week he has 27 lawns left to mow. How many lawns has Mr. Job mowed?
4. Mrs. Jones shared \$40 equally among her 8 children. Mr. Bradshaw gave his two sons an equal amount of money. If each child received the same amount of money, what is the total amount of money that Mr. Bradshaw gave to his sons?
5. If $\star + \bigcirc = 49$
 $\bigcirc + \bigcirc = 36$
 What is the value of $\star$?
6. The pet store had some goldfish. Eight goldfish were sold. There are 28 goldfish left. How many goldfish did the pet store have before some were sold?
7. Erik worked 13 hours and Alex worked 22 hours on a project. Isaac and Marvin worked on their projects the same number of hours that Eric and Alex worked in total. If Isaac worked 17 hours on his project, how many hours did Marvin work?
8. What number should go in the circle?



Chapter Review

Complete the number sentences.

1. $\square \div 7 = 287$
2. $250 - \square = 78$
3. $\square \times 124 = 372$
4. $397 + \square = 1091$
5. $\square \times 7 = 315 \times 3$
6. $\square + 14 = 257 + 10$
7. $152 - 34 = \square - 42$

Write = or $\neq$ in the box to make each number sentence true.

8. $14 \div 2 \square 56 \div 8$
9. $105 \times 4 \square 21 \times 20$
10. $255 + 43 \square 155 + 143$

Solve the problems below.

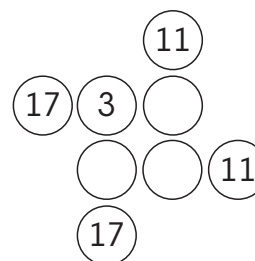
11. $\triangle = 25$ and $\diamond = 125$.
 $\triangle + \bigcirc + \bigcirc = \diamond$
 What is the value of $\bigcirc$?
12. $\square = 150$
 $\square + \text{pentagon} + \text{pentagon} = \square + \square$
 What is the value of pentagon ?
13. The product of two numbers is 480. If one number is 24. What is the other number?



14. Jane bought a dress for \$155 and a bag at the mall. Altogether she spent \$286. How much did the bag cost?
15. A mason was paid \$2 per block to build a wall of 260 blocks. A tile layer was paid \$10 an hour to tile a room. After tiling the room he received the same amount of money as the mason. How many hours did the tile layer work?



16. A baker has cupcake trays with 12 cupcake pans and 6 cupcake pans. The baker baked 4 trays of 12 cupcake pans and some trays of 6 cupcake pans. The total number of cupcakes from each type of tray are equal. How many 6 cupcake pan trays did the baker use?
17. The sum of the three numbers in each line of circles below is 24. Write the missing numbers in each circle.



18. What number has to be divided by 8 to equal 36 divided by 4?