

Texas Essential Knowledge and Skills

(5.1)(A) use place value to read numbers through 999,999,999,999.

(5.3)(A) use subtraction to solve problems.

(5.15)(A) explain observations using words.

(5.16)(A) make generalizations from patterns.

(5.16)(B) explain the solution process.

- Sequences
- Digits

Power Up

facts

Power Up A¹

count aloud

Count by tens from 10 to 100. Count by hundreds from 100 to 1000.

mental math

- Addition:** $3 + 3$
- Addition:** $30 + 30$
- Addition:** $300 + 300$
- Addition:** $40 + 50$
- Addition:** $200 + 600$
- Money:** $50\text{¢} + 50\text{¢}$
- Money:** $20\text{¢} + 20\text{¢} + 20\text{¢}$
- Addition:** $500 + 500 + 500$

problem solving

Fill in the missing numbers:

17, 15, 13, _____, _____, _____, 5, 3, 1

Focus Strategy: Find a Pattern

Understand We are given a list of numbers. Some of the numbers are missing. We are asked to find the missing numbers.

Plan We will *find a pattern*. We see that the numbers “count down,” or decrease, from left to right. We look for a “counting down” pattern to help us find the missing numbers.

Solve We notice that the numbers decrease by twos. The second number, 15, is two less than the first number. The third number, 13, is two less than 15.

¹ For instructions on how to use the Power Up activities, please consult the preface.

On the right, we see that the number 3 is two less than 5, and that the number 1 is two less than 3.

The pattern is “count down by twos.” Two less than 13 is 11, two less than 11 is 9, and two less than 9 is 7. So the missing numbers are **11, 9, and 7**.

Check We know our answer is reasonable because each number we found is two less than the previous number in the list, which fits the pattern we found.

New Concepts

Sequences

Counting is a math skill that we learn early in life. Counting by ones, we say the numbers

1, 2, 3, 4, 5, 6, ...

These numbers are called **counting numbers**. We can also count by a number other than one. Below we show the first five numbers for counting by twos and the first five numbers for counting by fives.

2, 4, 6, 8, 10, ...

5, 10, 15, 20, 25, ...

An ordered list of numbers forms a **sequence**. Each member of the sequence is a **term**. We can study a sequence to discover its counting pattern, or rule. The rule can be used to find more terms in the sequence.

Connect What is another way to describe the rule of each sequence?

Example 1

What are the next three terms in this counting sequence?

3, 6, 9, 12, _____, _____, _____, ...

The pattern is “count up by threes.” To find the next three terms, we may count up by threes, or we may count up by ones and emphasize every third term (one, two, *three*, four, five, *six*, ...). Either way, we find that the next three terms are **15, 18, and 21**.

Example 2

Describe the rule for the counting sequence below. What is the next term in the sequence?

56, 49, 42, _____, ...

Reading Math

The three dots mean that the sequence continues even though the numbers are not written.

This sequence counts down. We find that the rule for this sequence is “**count down by sevens.**” Counting down by seven from 42 gives us **35**.

Represent Write a sequence using the rule “count down by sixes.”

Digits

There are ten **digits** in our number system. They are 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. The number 385 has three digits, and the last digit is 5. The number 148,567,896,094 has twelve digits, and the last digit is 4.

Example 3

The number 186,000 has how many digits?

The number 186,000 has **six digits**.

Example 4

What is the last digit of 26,348?

The number 26,348 has five digits. The last digit is **8**.

Lesson Practice

Generalize Describe the rule for each counting sequence. Then write the next three terms in the sequence.

a. 6, 8, 10, _____, _____, _____, ...

b. 7, 14, 21, _____, _____, _____, ...

c. 4, 8, 12, _____, _____, _____, ...

d. 21, 18, 15, _____, _____, _____, ...

e. 45, 40, 35, _____, _____, _____, ...

f. 12, 18, 24, _____, _____, _____, ...

How many digits are in each of these numbers?

g. 36,756

h. 8002

i. 1,287,495

What is the last digit of each of these numbers?

j. 17

k. 3586

l. 654,321

m. **Represent** Write a sequence using the rule “count down by nines.”

Written Practice

Distributed and Integrated

Connect Write the next term in each counting sequence:

- *1. 10, 15, 20, _____, ... *2. 56, 49, 42, _____, ... *3. 8, 16, 24, _____, ...
*4. 18, 27, 36, 45, _____, ... *5. 24, 21, 18, _____, ... *6. 32, 28, 24, 20, _____, ...

Connect Write the missing term in each counting sequence:

- *7. 7, 14, _____, 28, 35, ... *8. 40, _____, 30, 25, 20, ...
*9. 20, _____, 28, 32, 36, ... *10. 24, 32, _____, 48, ...
*11. _____, 36, 30, 24, ... *12. 21, 28, _____, 42, ...

Generalize Describe the rule for each counting sequence, and write the next three terms.

- *13. 3, 6, 9, 12, _____, _____, _____, ... *14. 8, 16, 24, _____, _____, _____, ...
*15. 6, 12, 18, _____, _____, _____, ... *16. 40, 35, 30, _____, _____, _____, ...
*17. 18, 21, 24, _____, _____, _____, ... *18. 9, 18, 27, _____, _____, _____, ...

19. What word names an ordered list of numbers?

How many digits are in each number?

20. 186,000 21. 73,842 22. 30,004,091

Classify What is the last digit of each number?

- *23. 26,348 *24. 347 *25. 9,675,420

* Beginning in this lesson, we star the exercises that cover challenging or recently presented content. We encourage students to work first on the starred exercises with which they might want help, saving the easier exercises for last.