

6-6 Sequences and Expressions - Practice and Problem Solving

Use words and symbols to describe the value of each term as a function of its position. Then find the value of the twelfth term in the sequence.

5.

Position	3	4	5	6	n
Value of Term	12	13	14	15	■

The pattern is: add 9 to the position number or $n + 9$.

$$n + 9 = (12) + 9$$

$$= 21$$

7.

Position	1	2	3	4	n
Value of Term	5	10	15	20	■

The pattern is: multiply the position number by 5 or $5n$.

$$5n = 5(12)$$

$$= 60$$

9. **MEASUREMENT** There are 60 minutes in 1 hour. Make a table and write an algebraic expression relating the number of hours to the number of minutes. Then find the duration of the movies in hours if Hannah and her friends watched two movies that together were 240 minutes long.

The pattern is: divide the number of minutes by 60 to get the number of hours.

Minutes	Hours
60	1
120	2
180	3
n	$n \div 60$

$$n \div 60 = (240) \div 60$$

$$= 4$$

The duration of the movies was 4 hours.

ANALYZE TABLES Use the table at the right and the following information.

The table shows the amount it costs to rock climb at an indoor rock climbing facility, based on the number of hours.

Time (h)	Amount (\$)
1	13
2	21
3	29
4	37
n	■

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11. How does the cost change with each additional hour?

The amount increases by \$8 for each additional hour.

Determine how the next term in each sequence can be found. Then find the next two terms in the sequence.

13. 1, 4, 7, 10, ...

The pattern is: add 3. The next two terms are $10 + 3$ or 13 and $13 + 3$ or 16.

15. 2.3, 3.2, 4.1, 5.0, ...

The pattern is: add 0.9. The next two terms are $5 + 0.9$ or 5.9 and $5.9 + 0.9$ or 6.8.

17. $1\frac{1}{2}$, 3, $4\frac{1}{2}$, 6, ...

The pattern is: add $1\frac{1}{2}$. The next two terms are

$$6 + 1\frac{1}{2} = 7\frac{1}{2} \text{ and } 7\frac{1}{2} + 1\frac{1}{2} = 9.$$

Find the missing number in each sequence.

19. 7, ■, 16, $20\frac{1}{2}$, ...

The pattern is: add $4\frac{1}{2}$.

$$\text{The missing number is } 7 + 4\frac{1}{2} = 11\frac{1}{2}.$$

21. 30, ■, 19, $13\frac{1}{2}$, ...

The pattern is: subtract $5\frac{1}{2}$.

$$\text{The missing number is } 30 - 5\frac{1}{2} = 24\frac{1}{2}.$$

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23. **MEASUREMENT** There are 24 hours in 1 day. Make a table and write an algebraic expression relating the number of hours to the number of days. Then find the number of hours in 1 week.

The pattern is multiply the number of days by 24 to get the number of hours or $24n$.

Hours	Days
24	1
48	2
72	3
96	4
$24n$	n

There are 7 days in a week.

$$24n = 24(7)$$

$$= 168$$

There are 168 hours in a week.

25. **OPEN ENDED** Create a sequence in which $1\frac{1}{4}$ is added to each number.

Sample answer:

$$1, 2\frac{1}{4}, 3\frac{1}{2}, 4\frac{3}{4}, \dots$$

27. **ANALYZE TABLES** Use words and symbols to generalize the relationship of each term as a function of its position. Then determine the value of the term when $n = 100$.

Position	1	2	3	4	5	n
Value of Term	1	4	9	16	25	?

The pattern is: the value of each term is the square of its position or n^2 .

$$n^2 = (100)^2$$

$$= 10,000$$

29. What is the rule to find the value of the missing term in the sequence below?

Position, x	Value of Term
1	1
2	5
3	9
4	13
5	17
x	■

- A $x + 4$
B $4x - 3$
C $4x$
D $x - 3$

The pattern is: 4 times the position number minus 3 or $4x - 3$.

The answer is B.

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31. **ART** Mr. Torres is hanging his students' drawings in rows on one wall of his classroom. He places 1 drawing on the top row, 3 on the second row, and 5 on the third row. If this pattern continues, how many drawings will be on the seventh row?

The pattern is: add 2. Use the pattern to make a table of values.

Row	Number of Drawings
1	1
2	3
3	5
4	7
5	9
6	11
7	13

Mr. Torres will hang 13 drawings in the seventh row.

Solve each proportion.

33. $\frac{5}{x} = \frac{45}{63}$

Since $45 \div 9 = 5$, divide the numerator and the denominator by 9.

$$\begin{aligned}\frac{45}{63} &= \frac{45 \div 9}{63 \div 9} \\ &= \frac{5}{7} \\ x &= 7\end{aligned}$$

35. $\frac{x}{75} = \frac{5}{25}$

Since $25 \times 3 = 75$, multiply the numerator and the denominator by 3.

$$\begin{aligned}\frac{5}{25} &= \frac{5 \times 3}{25 \times 3} \\ &= \frac{15}{75} \\ x &= 15\end{aligned}$$

PREREQUISITE SKILL Determine what number should be added to the first number to get the second number.

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37. $8\frac{1}{2}, 10$

$$\begin{array}{r} 10 \\ -8\frac{1}{2} \\ \hline \end{array} \rightarrow \begin{array}{r} 9\frac{2}{2} \\ -8\frac{1}{2} \\ \hline 1\frac{1}{2} \end{array}$$

39. $1\frac{2}{3}, 2\frac{1}{3}$

$$\begin{array}{r} 2\frac{1}{3} \\ -1\frac{2}{3} \\ \hline \end{array} \rightarrow \begin{array}{r} 1\frac{4}{3} \\ -1\frac{2}{3} \\ \hline \frac{2}{3} \end{array}$$