

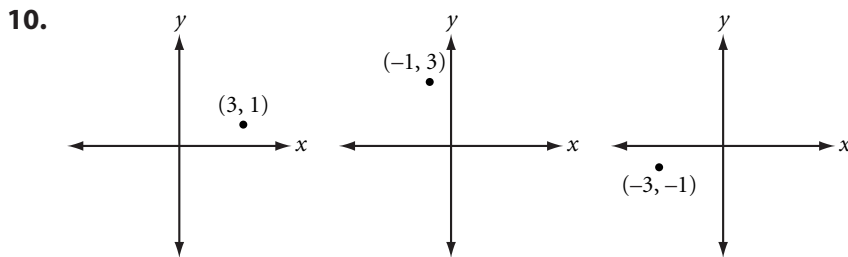
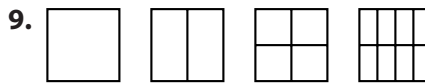
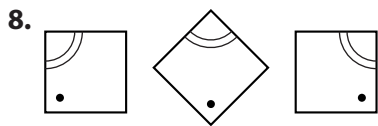
# Inductive Reasoning

Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

For Exercises 1–7, use inductive reasoning to find the next two terms in each sequence.

1. 4, 8, 12, 16, \_\_\_\_\_, \_\_\_\_\_
2. 400, 200, 100, 50, 25, \_\_\_\_\_, \_\_\_\_\_
3.  $\frac{1}{8}, \frac{2}{7}, \frac{1}{2}, \frac{4}{5},$  \_\_\_\_\_, \_\_\_\_\_
4. -5, 3, -2, 1, -1, 0, \_\_\_\_\_, \_\_\_\_\_
5. 360, 180, 120, 90, \_\_\_\_\_, \_\_\_\_\_
6. 1, 3, 9, 27, 81, \_\_\_\_\_, \_\_\_\_\_
7. 1, 5, 14, 30, 55, \_\_\_\_\_, \_\_\_\_\_

For Exercises 8–10, use inductive reasoning to draw the next two shapes in each picture pattern.



For Exercises 11–13, use inductive reasoning to test each conjecture. Decide if the conjecture seems true or false. If it seems false, give a counterexample.

11. The square of a number is larger than the number.
12. Every multiple of 11 is a “palindrome,” that is, a number that reads the same forward and backward.
13. The difference of two consecutive square numbers is an odd number.

# Finding the $n$ th Term

Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

For Exercises 1–4, tell whether the rule is a linear function.

1. 

|        |   |    |    |    |    |
|--------|---|----|----|----|----|
| $n$    | 1 | 2  | 3  | 4  | 5  |
| $f(n)$ | 8 | 15 | 22 | 29 | 36 |

2. 

|        |    |    |   |   |   |
|--------|----|----|---|---|---|
| $n$    | 1  | 2  | 3 | 4 | 5 |
| $g(n)$ | 14 | 11 | 8 | 5 | 2 |

3. 

|        |    |    |    |   |   |
|--------|----|----|----|---|---|
| $n$    | 1  | 2  | 3  | 4 | 5 |
| $h(n)$ | -9 | -6 | -2 | 3 | 9 |

4. 

|        |                |    |                |   |               |
|--------|----------------|----|----------------|---|---------------|
| $n$    | 1              | 2  | 3              | 4 | 5             |
| $j(n)$ | $-\frac{3}{2}$ | -1 | $-\frac{1}{2}$ | 0 | $\frac{1}{2}$ |

For Exercises 5 and 6, complete each table.

5. 

|                  |  |   |   |   |   |   |
|------------------|--|---|---|---|---|---|
| $n$              |  | 1 | 2 | 3 | 4 | 5 |
| $f(n) = 7n - 12$ |  |   |   |   |   |   |

6. 

|                  |  |   |   |   |   |   |
|------------------|--|---|---|---|---|---|
| $n$              |  | 1 | 2 | 3 | 4 | 5 |
| $g(n) = -8n - 2$ |  |   |   |   |   |   |

For Exercises 7–9, find the function rule for each sequence. Then find the 50th term in the sequence.

7. 

|        |   |    |    |    |    |    |     |     |     |    |
|--------|---|----|----|----|----|----|-----|-----|-----|----|
| $n$    | 1 | 2  | 3  | 4  | 5  | 6  | ... | $n$ | ... | 50 |
| $f(n)$ | 9 | 13 | 17 | 21 | 25 | 29 | ... |     | ... |    |

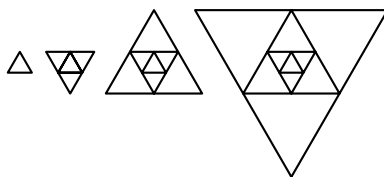
8. 

|        |   |   |    |    |     |     |     |     |     |    |
|--------|---|---|----|----|-----|-----|-----|-----|-----|----|
| $n$    | 1 | 2 | 3  | 4  | 5   | 6   | ... | $n$ | ... | 50 |
| $g(n)$ | 6 | 1 | -4 | -9 | -14 | -19 | ... |     | ... |    |

9. 

|        |     |   |     |   |     |   |     |     |     |    |
|--------|-----|---|-----|---|-----|---|-----|-----|-----|----|
| $n$    | 1   | 2 | 3   | 4 | 5   | 6 | ... | $n$ | ... | 50 |
| $h(n)$ | 6.5 | 7 | 7.5 | 8 | 8.5 | 9 | ... |     | ... |    |

10. Use the figures to complete the table.



|                     |   |   |   |   |   |     |     |     |    |
|---------------------|---|---|---|---|---|-----|-----|-----|----|
| $n$                 | 1 | 2 | 3 | 4 | 5 | ... | $n$ | ... | 50 |
| Number of triangles | 1 | 5 | 9 |   |   | ... |     | ... |    |

11. Use the figures above to complete the table. Assume that the area of the first figure is 1 square unit.

|                |   |   |    |   |   |     |     |     |    |
|----------------|---|---|----|---|---|-----|-----|-----|----|
| $n$            | 1 | 2 | 3  | 4 | 5 | ... | $n$ | ... | 50 |
| Area of figure | 1 | 4 | 16 |   |   | ... |     | ... |    |