Classroom Exercises

Tell whether the reasoning process is deductive or inductive.

1. Ramon noticed that spaghetti had been on the school menu for the past five Wednesdays. Ramon decides that the school always serves spaghetti on Wednesday.
2. Ky did his assignment, adding the lengths of the sides of triangles to find the perimeters. Noticing the results for several equilateral triangles, he guesses that the perimeter of every equilateral triangle is three times the length of a side.
3. By using the definitions of equilateral triangle (a triangle with three congruent sides) and of perimeter (the sum of the lengths of the sides of a figure), Katie concludes that the perimeter of every equilateral triangle is three times the length of a side.
4. Linda observes that $(-1)^2 = +1$, $(-1)^4 = +1$, and $(-1)^6 = +1$. She concludes that every even power of (-1) is equal to $+1$.
5. John knows that multiplying a number by -1 merely changes the sign of the number. He reasons that multiplying a number by an even power of -1 will change the sign of the number an even number of times. He concludes that this is equivalent to multiplying a number by $+1$, so that every even power of -1 is equal to $+1$.
6. Look at the discussion leading up to the statement of Theorem 3-13 on page 102. Is the thinking inductive or deductive?

Written Exercises

Look for a pattern and predict the next two numbers in each sequence.

A

1. 1, 4, 16, 64, . . .
2. 18, 15, 12, 9, . . .
3. $1, \frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \ldots$
4. 1, 4, 9, 16, . . .
5. 2, 3, 5, 8, 12, . . .
6. 10, 12, 16, 22, 30, . . .
7. 40, 39, 36, 31, 24, . . .
8. $8, -4, 2, -1, \frac{1}{2}, \ldots$
9. 2, 20, 10, 100, 50, . . .

Accept the two statements as given information. State a conclusion based on *deductive* reasoning. If no conclusion can be reached, write *none*.

10. Chan is older than Pedro.
    Pedro is older than Sarah.
11. Valerie is older than Greg.
    Dan is older than Greg.
12. Polygon G has more than 6 sides.
    Polygon G has fewer than 8 sides.
13. Polygon G has more than 6 sides.
    Polygon K has more than 6 sides.
14. There are three sisters. Two of them are athletes and two of them like tacos. Can you be sure that both of the athletes like tacos? Do you reason deductively or inductively to conclude the following? *At least one of the athletic sisters likes tacos.*