

Practice 4-7

Inductive and Deductive Reasoning

Use inductive reasoning to describe each pattern. Then find the next two numbers in each pattern.

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|-------------------------|-------------------------|
| 1. 10,16,22,28,... | 2. 9,6,3,0,... |
| 3. -12,-17,-22,-27,... | 4. -11,-8,-5,-2,... |
| 5. 80,40,20,10,... | 6. 3,9,27,81,... |
| 7. 9,10.5,12,13.5,... | 8. 1,-1.5,-4,-6.5,... |
| 9. 2,10,50,250,... | 10. 256,64,16,4,... |
| 11. -3,-0.6,1.8,4.2,... | 12. 6.2,4.5,2.8,1.1,... |

Look at the pattern of sums below. Write a function rule that gives the sum of the first n numbers in each pattern, where n is a natural number. Then predict the sum for $n = 10$.

13. $-1 = -1 = 1(2 \cdot 1 - 3)$
 $-1 + 3 = 2 = 2(2 \cdot 2 - 3)$
 $-1 + 3 + 7 = 9 = 3(2 \cdot 3 - 3)$
 $-1 + 3 + 7 + 11 = 20 = 4(2 \cdot 4 - 3)$

14. $\frac{1}{4} = \frac{1}{4} = -\frac{1}{4}(1 - 2^1)$
 $\frac{1}{4} + \frac{2}{4} = \frac{3}{4} = -\frac{1}{4}(1 - 2^2)$
 $\frac{1}{4} + \frac{2}{4} + \frac{4}{4} = \frac{7}{4} = -\frac{1}{4}(1 - 2^3)$
 $\frac{1}{4} + \frac{2}{4} + \frac{4}{4} + \frac{8}{4} = \frac{15}{4} = -\frac{1}{4}(1 - 2^4)$

Explain whether each situation represents inductive reasoning or deductive reasoning.

- Sandra only has one \$20 bill when she enters a grocery store. Each container of laundry detergent costs \$8.50. She concludes that she can buy at most two containers.
- When the alarm rings in the morning, David gets up and takes a shower. David's mom hears the bell ring one morning and concludes that David will be getting up and taking a shower.
- A meteorologist uses a graph showing the relative humidity versus the amount of rainfall. Based on the points, she concludes that the greater the rainfall, the higher the humidity.
- The length of a garden is 20 feet and the width is 30 feet. You conclude that the area of the garden is 600 square feet.

Find the next two numbers in each pattern.

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|-----------------------|--|
| 19. 1,10,100,1000,... | 20. 3,18,33,48,... |
| 21. 1,-4,-9,-14,... | 22. $\frac{1}{2}, -\frac{1}{2}, -\frac{3}{2}, -\frac{5}{2}, \dots$ |
| 23. 2.7,4.5,3,6.6,... | 24. 9.8,0.7,-8.4,-17.5,... |
| 25. 729,243,81,27,... | 26. 3,12,48,192,... |