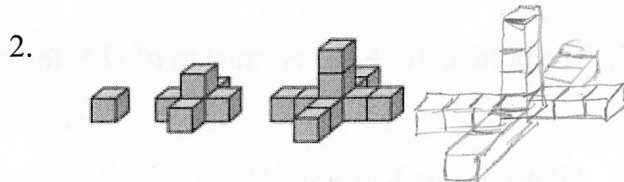
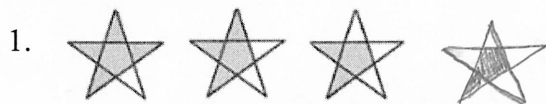
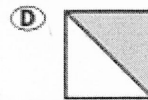
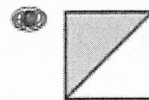
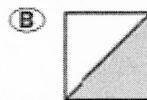
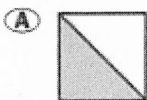
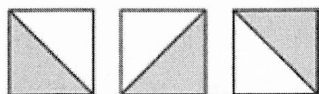


Sketch the next figure in the pattern.



3. What is the next figure in the pattern?



Describe the pattern in the numbers. Then write the next number in the pattern.

4. 1, 5, 9, 13, ... 17
 $+4$

Adding 4

5. 3, 12, 48, 192, ... 768
 $\times 4$

Multiply by 4

6. 10, 5, 2.5, 1.25, ... 0.625
 $\div 2$

Divide by 2

7. 4, 3, 1, -2, ... -6
 -1 -2 -3 -4

8. $1, \frac{2}{3}, \frac{1}{3}, 0, \dots -\frac{1}{3}$

Decreasing by $\frac{1}{3}$

9. 1, 3, 6, 10, 15, ... 21
 $+2$ $+3$ $+4$ $+5$ $+6$

10. $2, \frac{3}{2}, \frac{4}{3}, \frac{5}{4}, \dots \frac{5}{6}$
 $+1$ $+1$ $+1$ $+1$

11. 1, 8, 27, 64, 125, ... 216
perfect cubes

12. 2, 20, 10, 100, 50, ... 500
 $\times 10$ $\div 2$ $\times 10$ $\div 2$ $\times 10$

In Exercises 13 and 14, copy and complete the conjecture based on the pattern you observe in the specific cases.

Number of points	3	4	5	6	7
Picture					?
Number of connections	3	6	10	15	?

$+3$ $+7$ $+5$ $+6$ $+7$

13. Given seven noncollinear points, make a conjecture about the number of ways to connect different pairs of the points.
when you add a point, the number of connections increase by 1 from the previous difference.

14. **Conjecture:** You can connect seven noncollinear points 21 different ways.

15. Use these sums of odd integers: $3 + 7 = 10$; $1 + 7 = 8$; $17 + 21 = 38$

Conjecture: The sum of any two odd integers is even

In Exercises 16-19, show the conjecture is false by finding a counterexample.

16. If the product of two numbers is positive, then the two numbers must both be positive.

$$(-2)(-2) = 4$$

17. The product $(a + b)^2$ is equal to $a^2 + b^2$, for $a \neq 0$ and $b \neq 0$.

$$(2+3)^2 = 5^2 = 25 ; (2+3)^2 = 2^2 + 3^2 = 4 + 9 = 13$$

$$25 \neq 13$$

18. All prime numbers are odd.

2

19. If the product of two numbers is even, then the two numbers must both be even.

$$(2)(3) = 6$$

20. A student claims that the next number in the pattern 1, 2, 4, ... is 8, because each number shown is two times the previous number. Is there another description of the pattern that will give the same first three numbers, but lead to a different pattern?

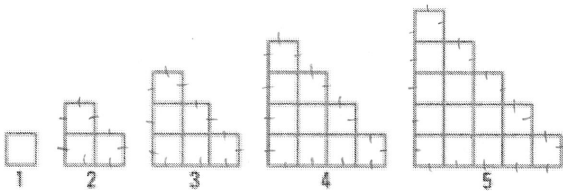
$$1, 2, 4, 7$$

$\xrightarrow{+1}$ $\xrightarrow{+2}$ $\xrightarrow{+3}$

21. You are watching a pitcher who throws two types of pitches, a fast ball and a curveball. You notice that the order of pitches was F, C, F, F, C, C, F, F, F. Assuming that this pattern continues, predict the next five pitches.

C, C, C, F, F

22. Use the pattern below. Each figure is made of squares that are 1 unit by 1 unit.



a.) Find the distance around each figure. Fill-in the chart below.

Figure	1	2	3	4	5
Distance	4	8	12	16	20

b.) Describe the pattern in the distances.

Distance increasing by 4 OR

$$\text{Figure \#} \times 4 = \text{Distance}$$

c.) Predict the distance around the 20th figure in this pattern.

$$\text{Distance} = 20 \times 4 = 80 \text{ units}$$

23. Set A consists of all multiples of 5 greater than 10 and less than 100. Set B consists of all multiples of 8 greater than 16 and less than 100. Show that each conjecture is false by finding a counterexample.

a.) Generate both Set A and Set B

Set A = 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95

Set B = 24, 32, 40, 48, 56, 64, 72, 80, 88, 96

b.) Any number in set A is also in set B. Counterex: 20 (many answers)

c.) Any number less than 100 is either in Set A or in Set B. 10 (many answers)

d.) No number is in both Set A and Set B 40, 80.