Multiplying Polynomials

Tri-Com Computers

Lesson 25-1 Multiplying Binomials

ACTIVITY 25

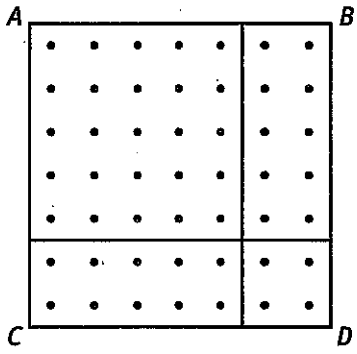
Learning Targets:

- Use a graphic organizer to multiply expressions.
- Use the Distributive Property to multiply expressions.

SUGGESTED LEARNING STRATEGIES: Think-Pair-Share, Look for a Pattern, Discussion Groups, Create Representations, Graphic Organizer

Tri-Com Computers is a company that sets up local area networks in offices. In setting up a network, consultants need to consider not only where to place computers, but also where to place peripheral equipment, such as printers.

Tri-Com typically sets up local area networks of computers and printers in square or rectangular offices. Printers are placed in each corner of the room. The primary printer A serves the first 25 computers and the other three printers, B, C, and D, are assigned to other regions in the room. Below is an example.



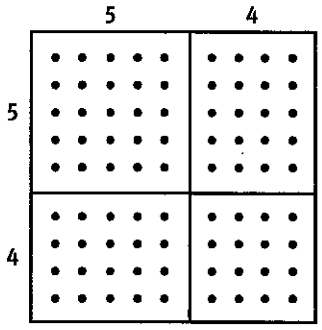
1. If each dot represents a computer, how many computers in this room will be assigned to each of the printers?

2. What is the total number of computers in the room? Describe two ways to find the total.

My Notes

My Notes

Another example of an office in which Tri-Com installed a network had 9 computers along each wall. The computers are aligned in an array with the number of computers in each region determined by the number of computers along the wall.



3. A technician claimed that since $9 = 5 + 4$, the number of computers in the office could be written as an expression using only the numbers 5 and 4. Is the technician correct? Explain.

4. Show another way to determine the total number of computers in the office.

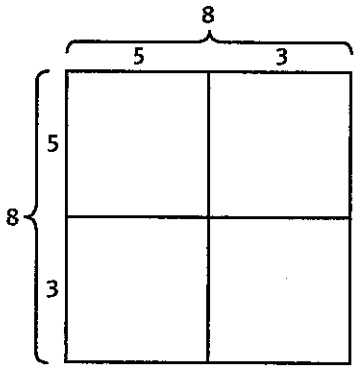
5. Rewrite the expression $(5 + 4)(5 + 4)$ using the Distributive Property.

6. Make sense of problems. Explain why $(5 + 4)(5 + 4)$ could be used to determine the total number of computers.

My Notes

7. The office to the right has 8^2 computers. Fill in the number of computers in each section if it is split into a $(5 + 3)^2$ configuration.

8. What is the total number of computers? Describe two ways to find the total.



9. For each possible office configuration below, draw a diagram like the one next to Item 7. Label the number of computers on the edge of each section and determine the total number of computers in the room by adding the number of computers in each section.

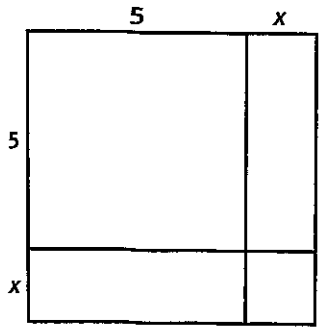
a. $(2 + 3)^2$

b. $(4 + 1)^2$

c. $(3 + 7)^2$

My Notes

Tri-Com has a minimum requirement of 25 computers per installation arranged in a 5 by 5 array. Some rooms are larger than others and can accommodate more than 5 computers along each wall to complete a square array. Use a variable expression to represent the total number of computers needed for any office having x more than the 5 computer minimum along each wall.



10. One technician said that $5^2 + x^2$ would be the correct way to represent the total number of computers in the office space. Use the diagram to explain how the statement is incorrect.

11. Model with mathematics. Write an expression for the sum of the number of computers in each region in Item 10.

12. For each of the possible room configurations, determine the total number of computers in the room.

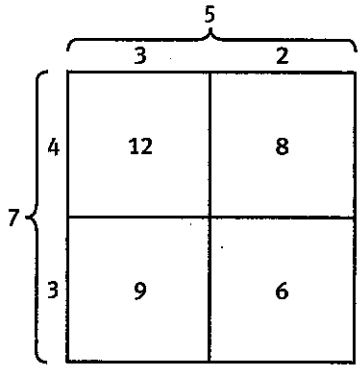
a. $(2 + x)^2$

b. $(x + 3)^2$

c. $(x + 6)^2$

My Notes

The graphic organizer below can be used to help arrange the multiplications of the Distributive Property. It does not need to be related to the number of computers in an office. For example, this graphic organizer shows $5 \cdot 7 = (3 + 2)(4 + 3)$.



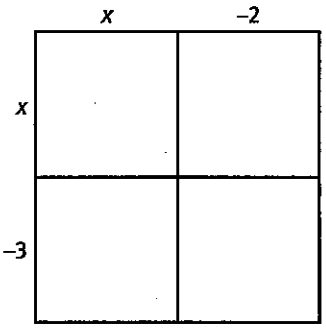
13. Draw a graphic organizer to represent the expression $(5 + 2)(2 + 3)$. Label each inner rectangle and find the sum.

14. Draw a graphic organizer to represent the expression $(6 - 3)(4 - 2)$. Label each inner rectangle and find the sum.

15. Multiply the binomials in Item 14 using the Distributive Property. What do you notice?

My Notes

You can use the same graphic organizer to multiply binomials that contain variables. The following diagram represents $(x - 2)(x - 3)$.



16. Use the graphic organizer above to represent the expression $(x - 2)(x - 3)$. Label each inner rectangle and find the sum.

17. Multiply the binomials in Item 16 using the Distributive Property. What do you notice?

18. Determine the product of the binomials.

a. $(x - 7)(x - 5)$ **b.** $(x - 7)(x + 5)$

c. $(x + 7)(x + 5)$ **d.** $(x + 7)(x - 5)$

e. $(4x + 1)(x + 3)$ **f.** $(2x - 1)(3x + 2)$

19. Reason abstractly. Examine the products in Item 18. How can you predict the sign of the last term?

My Notes

Check Your Understanding

20. Use a graphic organizer to calculate $(6 + 2)^2$. Explain why the product is not $6^2 + 2^2$.

Determine the product of the binomials using a graphic organizer or by using the Distributive Property.

21. $(x + 7)(x + 2)$

22. $(x + 7)(3x - 2)$

23. Compare the use of the graphic organizer and the use of the Distributive Property to find the product of two binomials.

LESSON 25-1 PRACTICE

Determine each product.

24. $(2 + 1)(3 + 5)$

25. $(2 + 3)(2 + 7)$

26. $(x + 9)(x + 3)$

27. $(x + 5)(x + 1)$

28. $(x - 3)(x + 4)$

29. $(x + 1)(x - 5)$

30. $(x + 3)(x - 3)$

31. $(x + 3)(x + 3)$

32. $(2x - 3)(x - 1)$

33. $(x + 7)(3x - 5)$

34. $(4x + 3)(2x + 1)$

35. $(6x - 2)(5x + 1)$

36. Critique the reasoning of others. A student determined the product $(x - 2)(x - 4)$. Identify and correct the student's error.

$$(x - 2)(x - 4)$$
$$x(x - 4) - 2(x - 4)$$
$$x^2 - 4x - 2x - 8$$
$$x^2 - 6x - 8$$