



Essential Ideas



THREE MEANINGS OF MINUS

- For each of the following, write an explanation of what the minus sign means.
 - -2
 - $-(2 + 2x)$
 - $x - 2$
 - $-y$

OPPOSITES

- Find the opposite of each quantity. Remember: A quantity and its opposite add up to zero.
 - x
 - 2
 - -2
 - $-x$
 - $x + 2$
 - $x - 2$

ADDING AND SUBTRACTING

In problems 3-4 you may want to make sketches or use the Lab Gear.

- Simplify. (Add and combine like terms.)
 - $(y^2 + x^2 - 3y) + (y + 3x^2 - x^2)$
 - $x + (25 - yx - y^2) + (xy - y - x)$
- Simplify. (Subtract; combine like terms.)
 - $(4 - x^2 - 5x) - 3x - 2$
 - $(4 - x^2 + 5x) - (3x - 2)$
 - $(4 + x^2 - 5x) - (3x + 2)$
 - $(-4 - x^2 - 5x) - (-3x + 2)$

MULTIPLYING

In problems 5-8 you may want to make sketches or use the Lab Gear.

- Multiply.
 - $2x \cdot 4x$
 - $5x \cdot 6y$
 - $3xy \cdot 10$
- The quantity $36xy$ can be written as the product $9x \cdot 4y$. Write $36xy$ as a product in at least four other ways.
- Multiply.
 - $2(x + y - 5)$
 - $x(x + y + 5)$
 - $x(-x + y + 5)$

- Choose two of the three multiplications in problem 7. Make a sketch of what they look like when modeled with the Lab Gear.

EXPONENTIAL NOTATION

- Write each of these numbers in exponential notation. If possible, find more than one way. It may help to use your calculator.
 - 32
 - 64
 - 256
 - 4096
 - 1
 - 6561

FUNCTIONS AND FUNCTION DIAGRAM

For each of the following problems:

- Copy the table.
- Describe the rule that allows you to get y from x .
- Use the rule to find the missing numbers. (In some cases, the missing numbers may be difficult to find; use trial and error and a calculator to make it easier.)
- Write y as a function of x .

10.

x	y
-1	-7
4	28
0	
	7

11.

x	y
3	4
12	1
6	2
	5

12.

x	y
5	2
	4
1	
	-1

- Make a function diagram in which the output (y) is always 4 more than the input (x).
 - Write a rule (function) for your function diagram.

14. a. Make a function diagram in which the output (y) is always 4 times the input (x).
 b. Write a rule (function) for your function diagram.
15. Make a function diagram with *time* on the x -number line (show one hour from the bottom to the top), and *distance* on the y -number line, to represent the motion of a cyclist riding at a constant speed of 15 miles per hour. Your diagram should have five in-out lines.

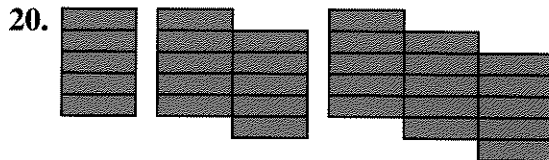
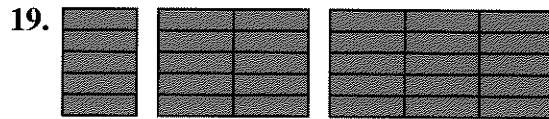
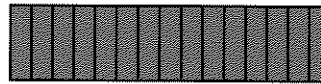
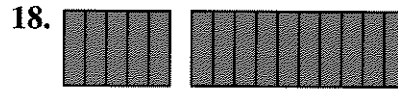
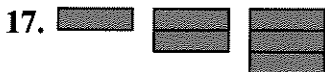
PATTERNS AND FUNCTIONS

16. Look at the sequence of figures. Think about how it would continue, following the pattern. Then:
- Sketch the next figure in the sequence.
 - Copy and complete a table like the one below.
 - Describe the pattern in words.



Figure #	Perimeter
1	...
2	...
3	...
4	...
10	...
100	...
n	...

Repeat problem 16 for these sequences.



21. In problem 16, what figure would have a perimeter of $88x + 2$? Use trial and error if necessary.
22. Which sequence in problems 17-20, if any, contains a perimeter of
- $2x + 100$?
 - $100x + 2$?
 - $100x + 100$?
23. Look at the xy -block.
- What is the perimeter of its top face?
 - What is its perimeter if $y = 1, 2, 3, 4, 10$? (Do not substitute a number for x .) Arrange your answers in a table.
 - Compare your table with those in problems 16-20. It should be the same as one of them. Which one? Explain.
24. Use blue blocks to make a figure. Substitute 1, 2, 3, ... for y in its perimeter to get the same sequence as problem 18. Check your work; make a table.

GEOBOARD TRIANGLES

25. On dot paper, sketch triangles having area 18, and having
- one horizontal and one vertical side;
 - one horizontal side, no vertical side;
 - no horizontal or vertical side.