Essential Ideas

THREE MEANINGS OF MINUS

1. For each of the following, write an explanation of what the minus sign means.

a. -2 b. $-(2 + 2x)$

c. $x - 2$ d. $-y$

OPPOSITES

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

a. x b. 2

c. -2 d. $-x$

e. $x + 2$ f. $x - 2$

ADDING AND SUBTRACTING

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

3. Simplify. (Add and combine like terms.)

a. $(y^2 + x^2 - 3y) + (y + 3x^2 - x^2)$

b. $x + (25 - yx - y^2) + (xy - y - x)$

4. Simplify. (Subtract; combine like terms.)

a. $(4 - x^2 - 5x) - 3x - 2$

b. $(4 - x^2 + 5x) - (3x - 2)$

c. $(4 + x^2 - 5x) - (3x + 2)$

d. $(-4 - x^2 - 5x) - (-3x + 2)$

MULTIPLYING

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

5. Multiply.

a. $2x \cdot 4x$ b. $5x \cdot 6y$

c. $3xy \cdot 10$

6. The quantity $36xy$ can be written as the product $9x \cdot 4y$. Write $36xy$ as a product in at least four other ways.

7. Multiply.

a. $2(x + y - 5)$ b. $x(x + y + 5)$

c. $x(-x + y + 5)$

8. 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

9. Write each of these numbers in exponential notation. If possible, find more than one way. It may help to use your calculator.

a. 32 b. 64 c. 256

d. 4096 e. 1 f. 6561

FUNCTIONS AND FUNCTION DIAGRAMS

For each of the following problems:

a. Copy the table.

b. Describe the rule that allows you to g y from x.

c. 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 mak it easier.)

d. 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

13. a. Make a function diagram in which th output (y) is always 4 more than the input (x).

b. Write a rule (function) for your funct 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:

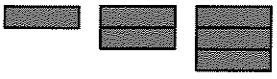
a. Sketch the next figure in the sequence.

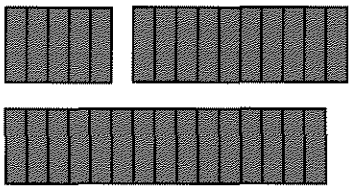
b. Copy and complete a table like the one below.

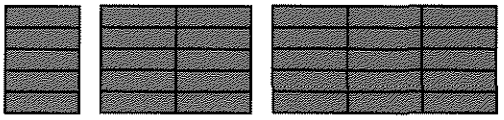
c. Describe the pattern in words.

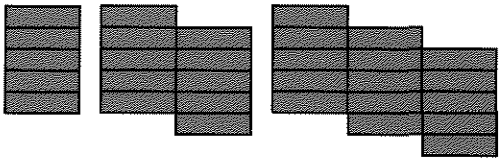
Figure #	Perimeter
1	...
2	...
3	...
4	...
10	...
100	...
n	...

Repeat problem 16 for these sequences.

17. 

18. 

19. 

20. 

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

a. $2x + 100$?

b. $100x + 2$?

c. $100x + 100$?

23. Look at the xy-block.

a. What is the perimeter of its top face?

b. What is its perimeter if $y = 1, 2, 3, 4, 10$? (Do not substitute a number for x.) Arrange your answers in a table.

c. 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

a. one horizontal and one vertical side;

b. one horizontal side, no vertical side;

c. no horizontal or vertical side.