

Determine whether the given table, ordered pairs, or words show a linear relationship. If yes then write an equation, use words, and include a graph of the relation.

1. $y = 2x + 4$

x	y
0	4
2	8
5	14
6	16
8	20

Linear; C.R.C. = 2

$\frac{4}{3} = 2$ $\frac{2}{1} = 2$ $\frac{4}{2} = 2$

4.

x	y
0	3
1	5
2	7
3	9
4	11

Linear; C.R.C. = 2

$y = 2x + 3$

7. $\{(5, 9), (-1, 3), (0, 4), (10, 14)\}$

Linear; C.R.C. = 1

$y = 1x + 4$

8. $\{(0, 0), (1, 1), (2, 4), (6, 36)\}$

Nonlinear

9. $\{(5, 15), (4, 12), (6, 20), (-2, 6)\}$

Nonlinear

10. $\{(5, -13), (11, -25), (-3, 3), (0, -3)\}$

Nonlinear

11. $\{(0, 1), (1, 3), (2, 9), (3, 27)\}$

Linear; C.R.C. = 3

$y = 2x + 3$

12. $\{(2, 8), (0, 0), (4, 64)\}$

Nonlinear

2. Nonlinear

x	y
2	5
4	9
6	12
8	16

$\frac{4}{2} = 2$ $\frac{3}{2} = 1.5$

5. Linear; C.R.C. = 5

x	y
0	4
2	9
4	14
6	19

$y = 5x + 4$

13. You get \$10 for showing up to babysit and then you receive \$7.50 for every hour you work.

Linear

$y = 10 + 7.50h$

14. You receive \$2 the first hour of babysitting and this amount is doubled every hour.

Nonlinear

3. Linear; C.R.C. = 5

x	y
0	0
1	5
2	10
3	15
4	20

$y = 5x$

6. Linear; C.R.C. = 3

x	y
0	-7
2	-1
5	8
7	14

$y = 3x - 7$

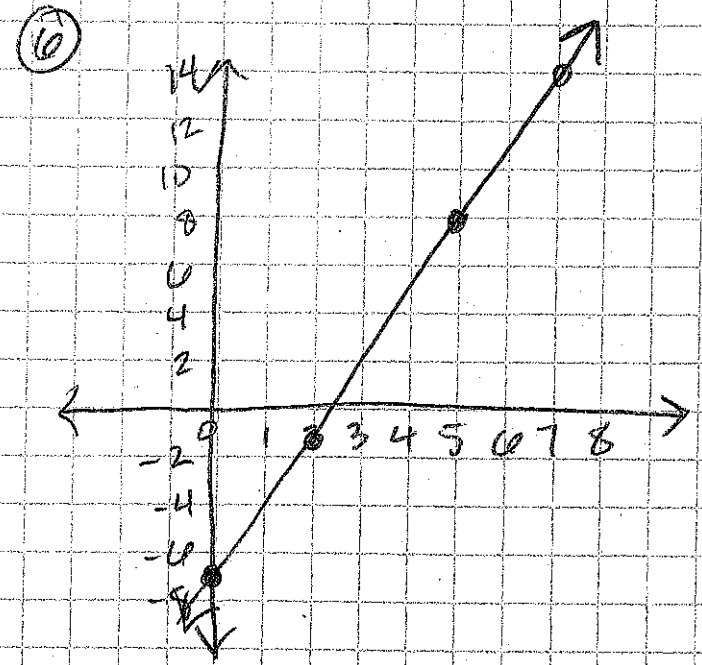
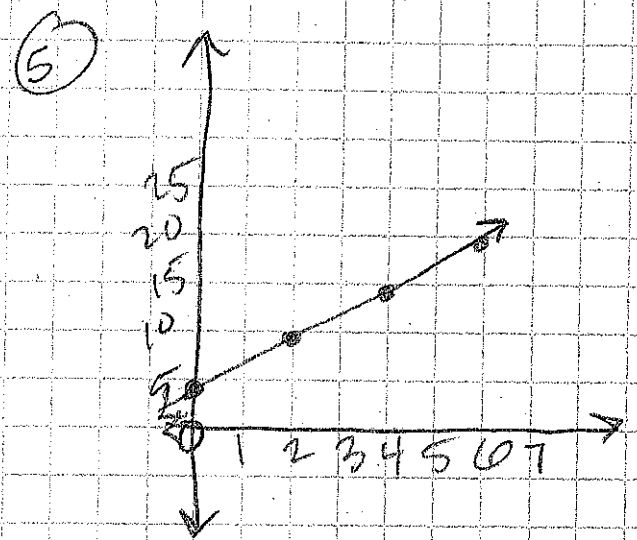
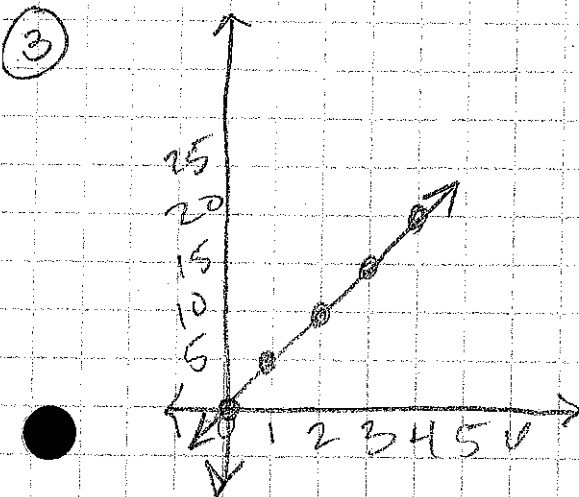
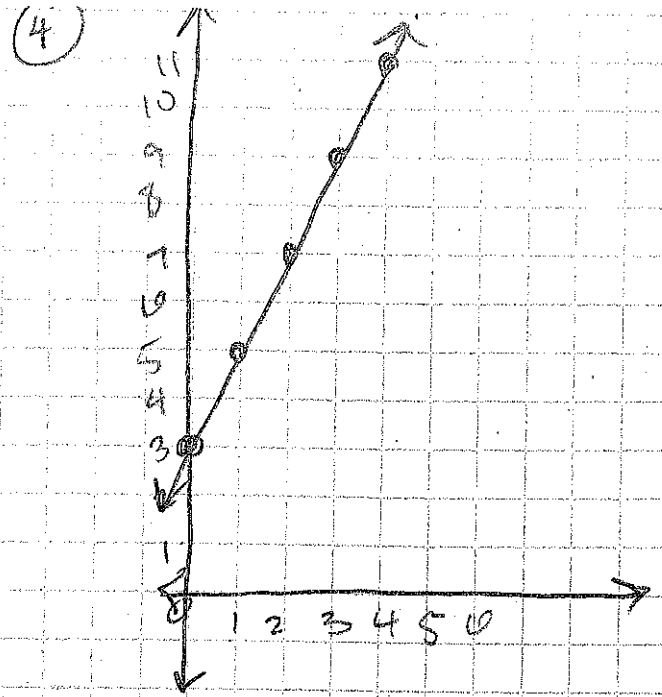
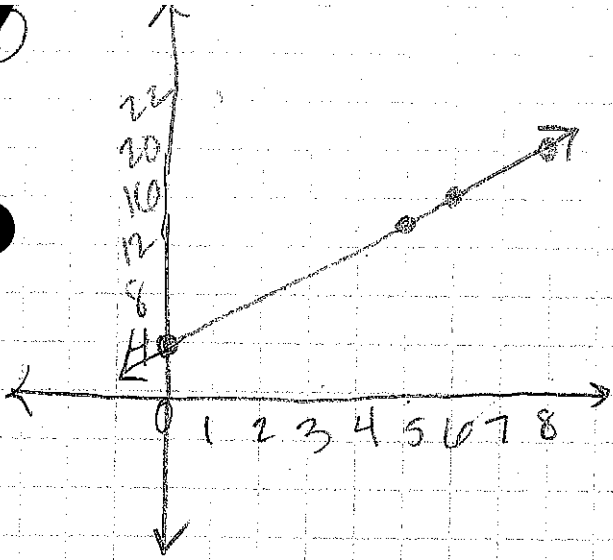
$\frac{4}{2} = 3$ $\frac{9}{3} = 3$

15. You have \$50 but you have to pay your parents back \$5 each week.

Linear

$y = 50 - 5w$

Don't worry about repeating



4-2

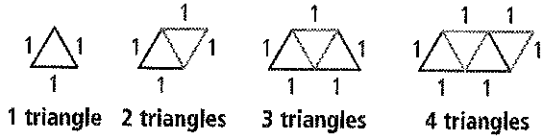
Practice

Form G

Patterns and Linear Functions

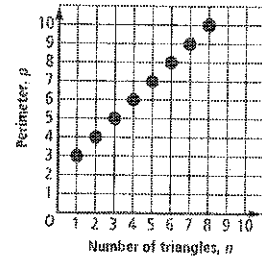
For each diagram, find the relationship between the number of shapes and the perimeter of the figure they form. Represent this relationship using a table, words, an equation, and a graph.

1.

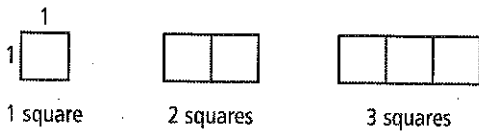


The perimeter is 2 more than the number of triangles; $p = n + 2$

Triangles	1	2	3	4	5	6	10	n
Perimeter	3	4	5	6	7	8	12	$n + 2$

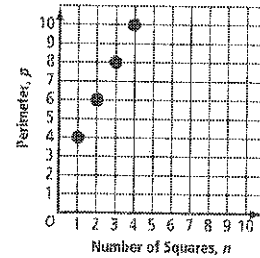


2.



The perimeter is 2 more than twice the number of squares; $p = 2n + 2$

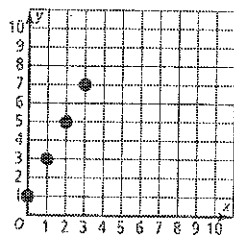
Squares	1	2	3	4	5	6	10	n
Perimeter	4	6	8	10	12	14	22	$2n + 2$



For each table, determine whether the relationship is a function. Then represent the relationship using words, an equation, and a graph.

3.

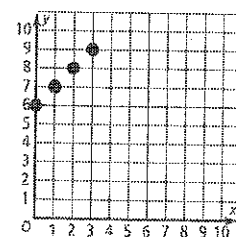
x	y
0	1
1	3
2	5
3	7



yes; the output y is 1 more than twice the input x ; $y = 2x + 1$

4.

x	y
0	6
1	7
2	8
3	9



yes; the output y is 6 more than the input x ; $y = x + 6$

4-2

Practice (continued)

Form G

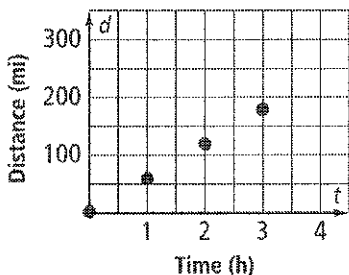
Patterns and Linear Functions

For each table, determine whether the relationship is a function. Then represent the relationship using words, an equation, and a graph.

5. Distance Traveled

Time (h)	Distance (mi)
0	0
1	55
2	110
3	165

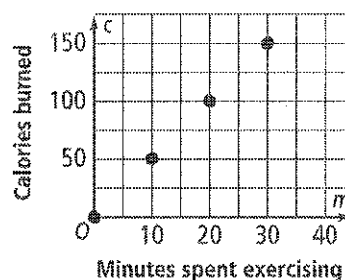
function; the distance traveled is 55 times the number of hours; $d = 55t$



6. Calories Burned

Minutes (min)	Calories (C)
0	0
10	50
20	100
30	150

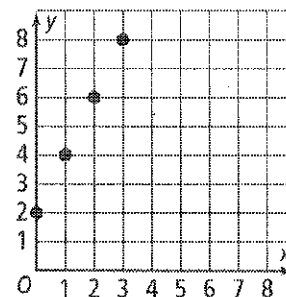
function; the calories burned are 5 times the number of minutes spent exercising; $c = 5m$



7. Reasoning Graph the set of ordered pairs (0, 2), (1, 4), (2, 6), (3, 8). Determine whether the relationship is a linear function.

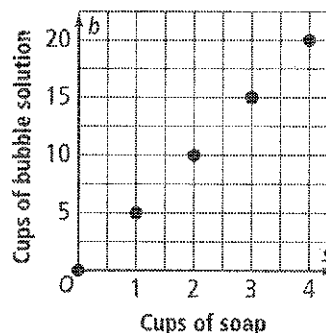
Explain how you know.

The function is linear; the points on the graph can be connected by a straight line.



8. You can make a bubble solution by mixing 1 cup of liquid soap with 4 cups of water. Represent the relationship between the cups of liquid soap and the cups of bubble solution made using a table, an equation, and a graph. Is the amount of bubble solution made a function of the amount of liquid soap used? Explain. $b = 5s$;

Cups of soap, s	Cups of bubble solution, b
0	0
1	5
2	10
3	15
4	20



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4-2 Standardized Test Prep

Patterns and Linear Functions

Multiple Choice

For Exercises 1–4, choose the correct letter.

1. Which equation represents the relationship shown in the table at the right? **C**

A. $y = -x - 3$

C. $y = 2x - 3$

B. $y = x - 3$

D. $y = -2x + 3$

x	y
0	-3
1	-1
2	1
3	3

2. In a relationship between variables, what is the variable called that changes in response to another variable? **I**

F. function

H. independent variable

G. input function

I. dependent variable

3. A lawn care company charges a \$10 trip fee plus \$0.15 per square foot of x square feet of lawn for fertilization. Which equation represents the relationship? **B**

A. $x = 0.10y + 15$

B. $y = 0.15x + 10$

C. $y = 10x + 0.15$

D. $x = 10y + 0.15$

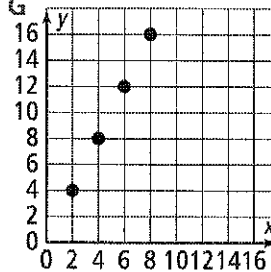
4. Which equation represents the relationship shown in the graph? **G**

F. $y = -2x$

H. $y = -\frac{1}{2}x$

G. $y = 2x$

I. $y = \frac{1}{2}x$



Short Response

5. The table below shows the relationship between the number of teachers and the number of students going on a field trip. How can the relationship be described using words, an equation, and a graph?

Field Trip					
Teachers	2	3	4	5	6
Students	34	51	68	85	102

The number of students is 17 times the number of teachers; $s = 17t$;

[2] All parts answered correctly.

[1] One or two parts answered correctly.

[0] No parts answered correctly.

