

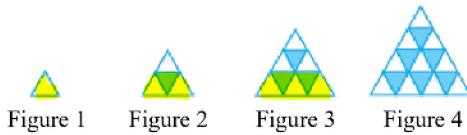
# Linear Relations Practice Test

Math 9

## Linear Relations Practice Test

Name: \_\_\_\_\_

1. Consider the relationship between the number of triangles on the **bottom** row (facing up and down) and the figure number.



a) Complete the table of values to represent the linear relation between the number of squares and the figure number. [1]

Figure Number, $n$	Number of Triangles, $t$
1	1
2	3
3	5
4	7

+2  
+2  
+2

b) Write a linear equation to represent this pattern. [2]

$$t = 2n - 1$$

c) How many bottom row triangles are in Figure 12? [2]

$$\begin{aligned} t &= 2(12) - 1 \\ &= 24 - 1 \\ &= 23 \end{aligned}$$

There are 23 triangles.

d) Which figure number has 81 triangles in the bottom row? [2]

$$\begin{aligned} 81 &= 2n - 1 \\ 82 &= 2n \quad +1 \\ \div 2 \quad \div 2 & \\ 41 &= n \end{aligned}$$

Figure 41 has 81 triangles.

2. The table shows the lengths of boats and the number of passengers each one can carry.

a) Identify the independent variable. [1]

Length (ft)

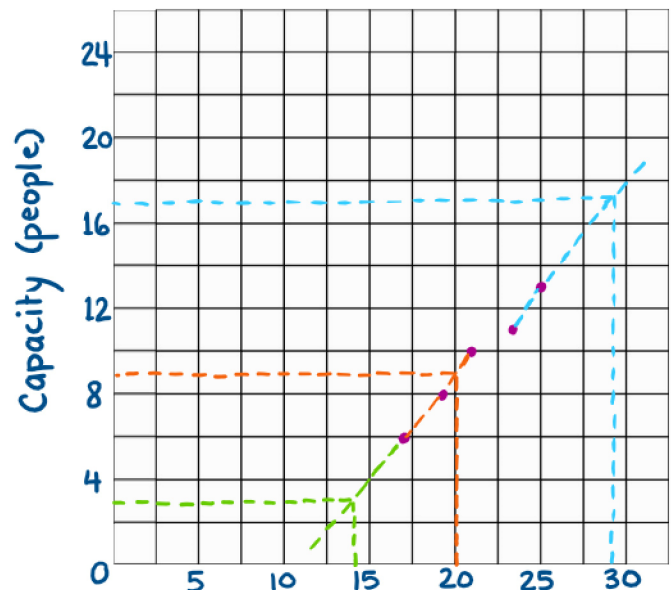
Length (feet)	17	19	21	23	25
Capacity (passengers)	6	8	10	11	13

b) Identify the dependent variable. [1]

Capacity

### Boat Capacity

c) Plot the ordered pairs. Include a title, label the axes, and indicate the scale. [3]



d) Interpolate to estimate the number of passengers that a 20-foot boat could carry. (Show your work on the graph.) [1]

9 passengers

e) Extrapolate to predict the number of passengers that a 29-foot boat could carry. (Show your work on the graph.) [1]

14 ft: 3 passengers

29 ft: 17 passengers

f) Should the points be connected by a straight line? Justify your answer. [2]

No, the number of passengers must be a whole number.

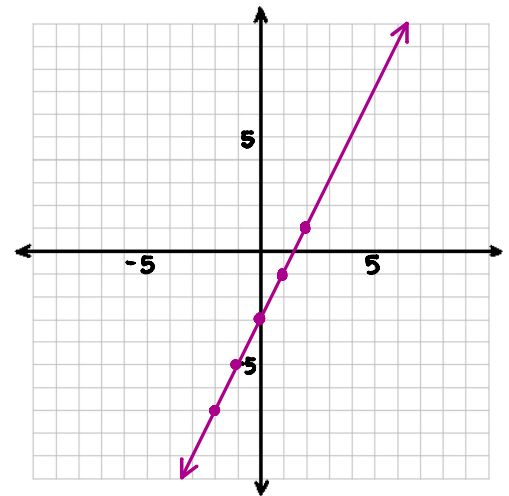
independent → Length (feet)

3. Create a table of values and graph the linear relation  $y = 2x - 3$ . Indicate the scale on the grid and use a ruler. [3]

$x$	$y$
-2	-7
-1	-5
0	-3
1	-1
2	1

$$2(-2) - 3 = -7$$

$$2(-1) - 3 = -5$$



What is the fixed term? [1]

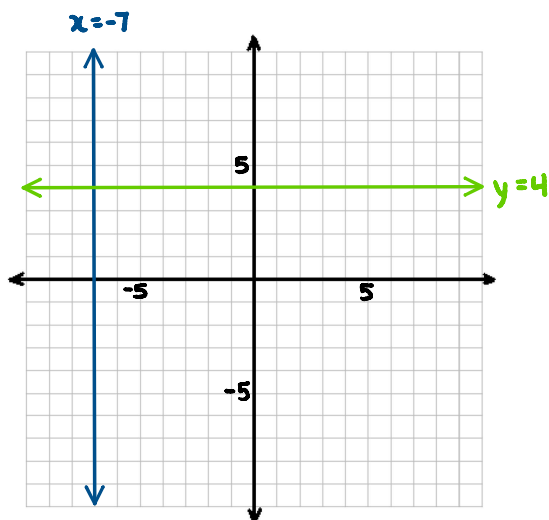
-3

What is the rate of change? [1]

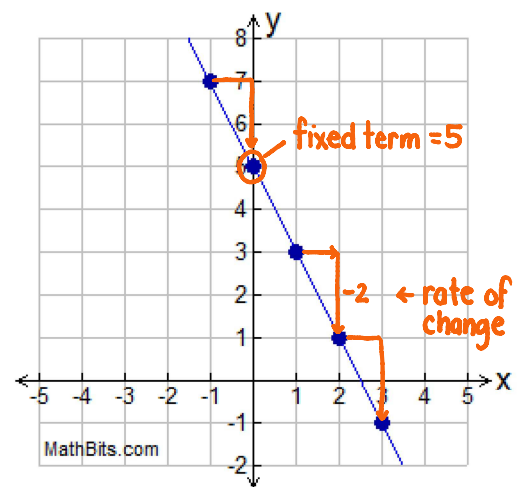
2

\*do not include the variable\*

4. Sketch the graphs of  $y = 4$  and  $x = -7$  on the same grid below. Use a ruler. [2]



5. Determine an equation that represents the line shown on the graph. [2]

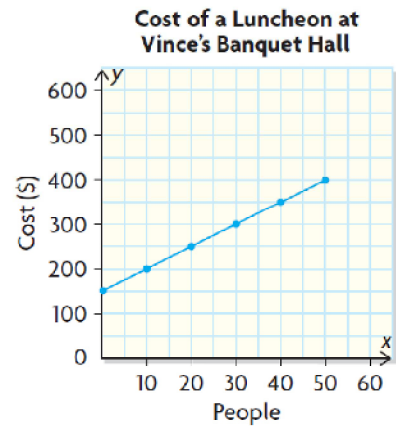


$$y = -2x + 5$$

6. The graph shows the relationship between the cost of a luncheon and the number of people.

a) Set up a table of values from points on the graph. [1]

Number of People	Cost (\$)
0	150
10	200
20	250
30	300
40	350
50	400



b) Describe the pattern shown in the graph. [1]

The cost increases \$50 for every 10 person increase.

(or \$5 per person)

c) What is the fixed cost of renting the banquet? [1]

\$150

d) What is the cost per person? [1]

\$5

$$50 \div 10 = 5$$

e) Determine an equation relating the number of people at the luncheon and the cost. [2]

$$C = 5n + 150$$

f) Use the equation to determine how many people attend a luncheon if the cost is \$500. [2]

$$500 = 5n + 150$$

$$\begin{array}{r} -150 \\ -150 \end{array}$$

$$350 = 5n$$

$$\begin{array}{r} \div 5 \\ \div 5 \end{array}$$

$$70 = n$$

70 people attend the luncheon.