Math 8                                    Name __KEY__

                                          Date _____

**Sec 4.7 – Graphing Linear Relations Notes**

1. **Graphing**

   On a coordinate grid, it is convention to use the horizontal axis to represent the _independent variable_
   and the vertical axis to represent the _dependent variable_

   When the points lie on a straight line, like in the investigation, we say that the relation is _linear_ .

2. **Describing Relations**

   The equations from the investigation all show a relationship between two variables. You need to know how to describe a relationship in the following ways:

   1) _Equation_
   2) _Words (Sentence)_
   3) _Table of Values_
   4) _Graph_

**Example 1 –** John wants to have a birthday party at the movie theatre. He knows that tickets cost $8 per person but the movie theatre will give him $6 off his total bill since it is his birthday.

a) If we let $C$ represent the total cost and $n$ represent the number of friends, write a formula John could use to calculate the total cost of his birthday.

$$C = 8n - 6$$

b) Create a table of values for the relation.          c) Graph the relation.

| n | C |
|---|---|
| 1 | 2 |
| 2 | 10 |
| 3 | 18 |
| 4 | 26 |
| 5 | 34 |
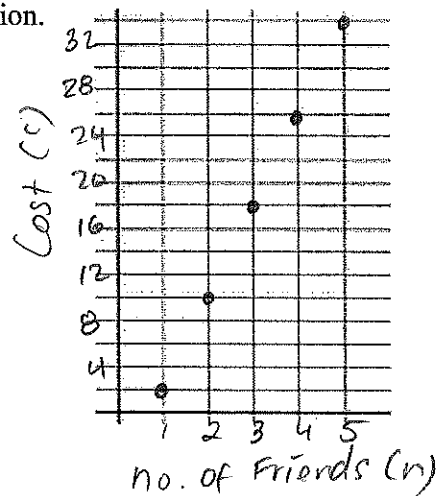


d) Describe the relationship between the variables in the graph.

For every additional guest, there is an increase in $8 (for total cost)

**Note:** We do not join the points since we cannot have 1.3 of a person. Therefore, the data listed in the example above are called _discreet_ since the numbers between the points are not meaningful in this problem.

**Example 2** – At the Pizza Factory, an extra-large pizza costs $13 plus $2 per additional topping.

a) If we let $C$ represent the total cost of the pizza and $n$ represent the number of additional toppings, write a formula to calculate the total cost of an extra-large pizza.

$$C = 2n + 13$$

b) Create a table of values for the relation.

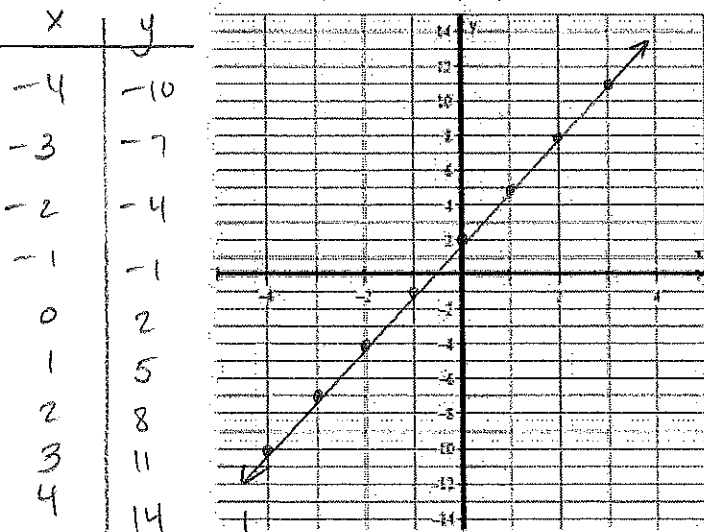| $n$ | $C$ |
|-----|-----|
| 1 | 15 |
| 2 | 17 |
| 3 | 19 |
| 4 | 21 |
| 5 | 23 |

c) Graph the relation.



"break"  no. of toppings (n)
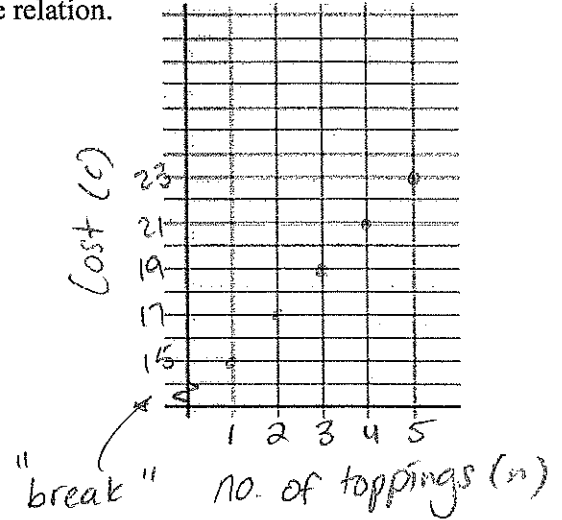
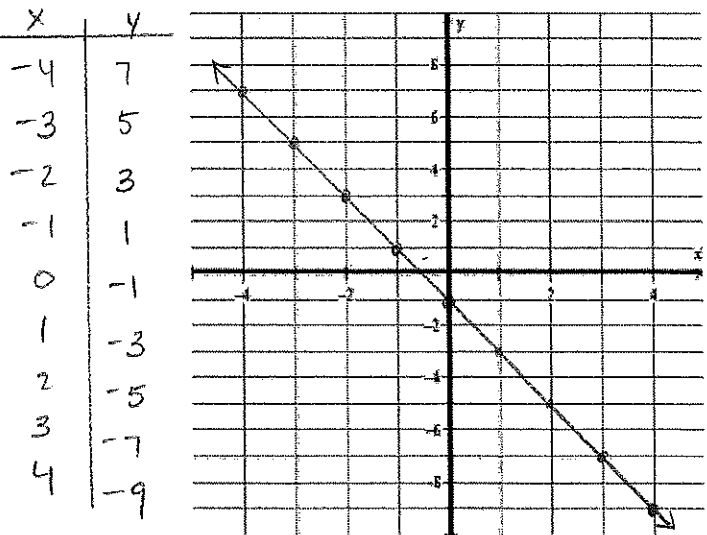d) Describe the relationship between the variables in the graph.

For each additional topping, there is an increase of $2 in the total cost.

3. Practice – Graph each relation for integer values of $x$ from – 4 to 4.

make a table of values

a) $y = 3x + 2$

| x | y |
|----|-----|
| −4 | −10 |
| −3 | −7 |
| −2 | −4 |
| −1 | −1 |
| 0 | 2 |
| 1 | 5 |
| 2 | 8 |
| 3 | 11 |
| 4 | 14 |



b) $y = -2x - 1$

| x | y |
|----|-----|
| −4 | 7 |
| −3 | 5 |
| −2 | 3 |
| −1 | 1 |
| 0 | −1 |
| 1 | −3 |
| 2 | −5 |
| 3 | −7 |
| 4 | −9 |



– can we connect the dots?

**Cooking the Notes**

You now know several ways to represent a relation (table of values, equation, graph, words). Which way tells you most about the relation? Explain why you think so.