

## Lesson 5 Properties of Linear Functions

To identify if a relation is linear function, we can use the following:

- a table of values
- a set of ordered pairs
- a graph

A community centre rents out its banquet hall for a charge of \$50 plus an additional fee of \$4 per person.

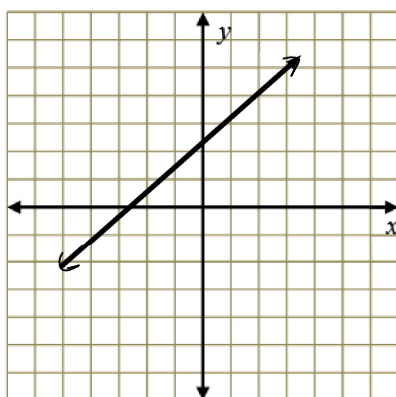
# of people (Independent)	Total cost (Dependent)
0	50
20	130
40	210
60	290
80	370
100	450

A constant change in the independent variable results in a constant change in the dependent variable.  
 therefore, this relation is a linear function.

Ordered Pairs:

a constant change in the x-values results in a constant change in the y-values means it represents a linear function.

Graph:



oblique line

# L5 Properties of Linear Functions.notebook

## Example 1 – Determine if the given relations are Linear Functions

### 1) Given a table of values

Rate of pay is:

Cost of monthly cell bill:

1<sup>st</sup> 100 \$0.10/min after \$0.50

Hours	Pay
0	0
2	10
4	20
6	30

+2 { +10  
+2 { +10  
+2 { +10  
∴ linear

Min. Used	Cost
0	20
100	30
200	120
300	170

+10 { +10  
+100 { +90 } not constant  
+100 { +50 } ∴ not linear

### 2) Given an equation

(Use a graphing calculator or graphing app to see if it is a line that passes the vertical line test.)

$y = 2x - 5$  → oblique line  
yes

$y = 3$  → horizontal line  
no

$x = 1$  → vertical line  
no

$y = 2x^2 + 4$  → parabola  
no

## Example 2 - Description given (Make a table of values)

- a) Company A charges \$2400 per year. The value is related to time and decreases by 10% each year.

Cost Charged Per Year (\$)	10% Decrease Per Year (\$)
2400	$2400 \times 0.1 = \$240$
2160	$2160 \times 0.1 = \$216$
1944	$1944 \times 0.1 = \$194.40$

-240 {  
-216 {  
not linear

- b) A plumber charges a \$80 flat rate and \$50 for each hour he works. The total cost of service is related to time.

Hours Worked	Charge (\$)
1	$(1 \times \$50) + \$80 = \$130$
2	$(2 \times 50) + 80 = 180$
3	$(3 \times 50) + 80 = 230$
4	280

+1 { +50  
+1 { +50  
+1 { +50  
linear