5.6 Properties of Linear Relations

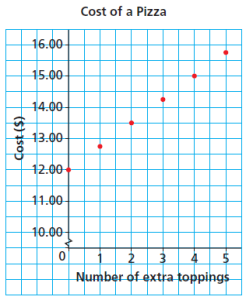
Lesson 8

Jan 30-4:12 PM

Connect NOTES:

The table of values and graph show the cost of a pizza with up to 5 extra toppings.

Number of Extra Toppings	Cost ($)
0	12.00
1	12.75
2	13.50
3	14.25
4	15.00
5	15.75



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Connect NOTES:

a) What patterns do you see in the table?

Cost -> Dependent Variable -> Range increasing by 0.75

Toppings -> Ind. Variable -> Domain increasing by 1

b) Write in words the relationship between the cost of a pizza to the number of its toppings.

As the cost increases by $0.75, the number of toppings increases by 1

c) How can you tell from the table that the graph represents a linear relation?

Rate of Change is the same $\frac{\Delta y}{\Delta x} = \frac{0.75}{1} = 0.75$

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Connect NOTES:

The cost for a car rental is $60, plus $20 for every 100 km driven. The independent variable is the distance driven and the dependent variable is the cost.

We can identify this as a linear relation in different ways.

Rate of Change $= \frac{20}{100} = \frac{1}{5}$ Slope $m = \frac{1}{5}$

TABLE OF VALUES

For a linear relation, a constant change in the independent variable results in a constant change in the dependent variable.

Distance (km)	Cost ($)	
0	60	
100	80	20
200	100	20
300	120	
400	140	

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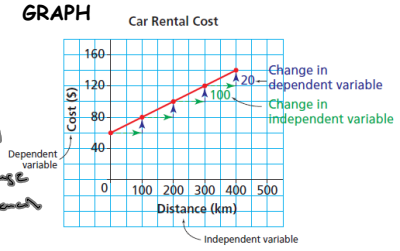
Connect NOTES:

The cost for a car rental is $60, plus $20 for every 100 km driven. The independent variable is the distance driven and the dependent variable is the cost.

We can identify this as a linear relation in different ways.

GRAPH



Rate of Change:

$\frac{\Delta y}{\Delta x}$ Change in Dep / Change in Ind

$\frac{20}{100}$ Change in Range / Change in Domain

$\frac{1}{5}$

Connect NOTES:

There are four key components to an equation:

Slope y int form.

$C = 0.20d + 60$

- Independent Variable
- Dependent Variable
- Rate of Change
- Constant (initial amount)

function:

$f(d) = \frac{1}{5}d + 60$

or

$f(d) = \frac{d}{5} + 60$

Practice EXAMPLE 1

Determine whether a Table of Values Represents a Linear Relation

Which table of values represents a linear Relation?

Linear

C	F	
0	32	
5	41	9
10	50	9
15	59	9
20	68	9
		5 5 5 5

Not Linear

I	P	
0	0	
5	75	75
10	300	225
15	675	375
20	1200	525
		5 5 5 5

not the same

Practice YOU TRY!

Determine whether a Table of Values Represents a Linear Relation

Which table of values represents a linear Relation?

Not Linear

t	n	
0	1	
20	2	1
40	4	2
60	8	4
80	16	8
100	32	16
		20 20 20

Linear.

A	T	
60	3	
120	6	3
180	9	3
240	12	3
300	15	3
		60 60 60 60

Practice **EXAMPLE 2**

Determining whether an equation represents a linear relation

Graph the following equation $y = -3x + 25$

Step 1: Make a table of values:

X	Y
0	25
1	22
2	19
3	16
4	13
5	10

1 [ ] -3 ← Constant

Rate of Change $\frac{-3}{1}$

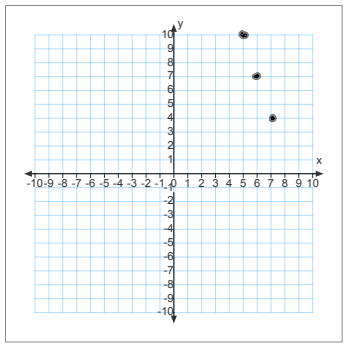
Practice **EXAMPLE 2**

Determining whether an equation represents a linear relation

$y = -3x + 25$

Step 2: Plot the order points on the graph

X	Y
0	25
1	22
2	19
3	16
4	13
5	10
6	7
7	4



Practice **EXAMPLE 3**

Determining whether an equation represents a linear relation

Graph the following equation $y = 2x^2 + 5$

Step 1: Make a table of values:

X	Y
-3	23
-2	13
-1	7
0	5
1	7
2	13
3	23

Constant y-int

Slope Rate of Change.

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

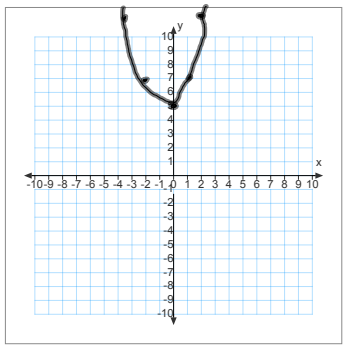
Practice **EXAMPLE 3**

Determining whether an equation represents a linear relation

$y = 2x^2 + 5$

Step 2: Plot the order points on the graph

X	Y
-3	23
-2	13
-1	7
0	5
1	7
2	13
3	23



Practice **EXAMPLE 4**

Determining whether an equation represents a linear relation

Graph the following equation y = 5

Step 1: Make a table of values:

X	Y
-2	5
-1	5
0	5
1	5
2	5
3	5

↳ Any value of x y is the same.

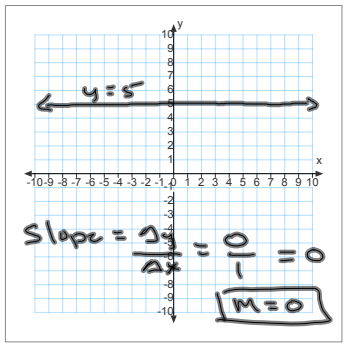
Practice **EXAMPLE 4**

Determining whether an equation represents a linear relation

y = 5

Step 2: Plot the order points on the graph

X	Y
-2	5
-1	5
0	5
1	5
2	5
3	5



Practice **EXAMPLE 5**

Determining whether an equation represents a linear relation

Graph the following equation x = 5

Step 1: Make a table of values:

X	Y
5	-1
5	0
5	1
5	2
5	3
5	4

↳ As y increases or decreases x stays the same.

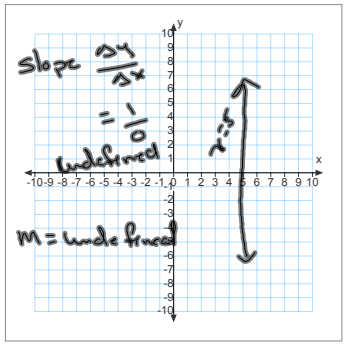
Practice **EXAMPLE 5**

Determining whether an equation represents a linear relation

x = 5

Step 2: Plot the order points on the graph

X	Y
5	-2
5	-1
5	0
5	1
5	2
5	3



Practice

HOMEWORK!

Textbook Questions:

Page 304 # 2 (check your understanding)

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