

MARCH 11, 2020

UNIT 6: LINEAR RELATIONS

4.2: LINEAR RELATIONS

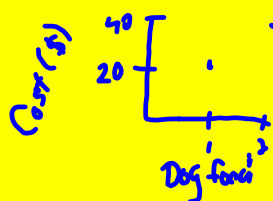
K. SEARS  
MATH 9



WHAT'S THE POINT OF TODAY'S LESSON?

We will begin working on the Math 9 Specific Curriculum Outcome (SCO) "Patterns and Relations 2" OR "PR2" which states:

"Graph linear relations, analyze the graph and interpolate or extrapolate to solve problems."



How much does 1 bag cost? \$20  
interpolate

How much does 3 bags cost? \$60  
extrapolate

**SECTION 4.2: LINEAR RELATIONS**

For this section of the unit, we need to be familiar with some more VOCABULARY:

1. **DISCRETE DATA:** Data that does NOT have an infinite number of values between whole numbers; in graphs containing discrete data, points are NOT joined together to signify this. (Think NO fractions and NO decimals.)

examples: number of people, number of squares



2. **CONTINUOUS DATA:** Data that has an infinite number of values between whole numbers; in graphs containing continuous data, points are joined together to signify this. (Think fractions and decimals.)

examples: heights, distances, times, temperature, speed

**VOCABULARY:**

3. **DEPENDENT VARIABLE:** A variable whose value **depends** on the value of another (the *independent* variable). It is plotted on the y-axis of a graph.  $y = 2x + 1$

4. **INDEPENDENT VARIABLE:** A variable whose value is **NOT** dependent on the value of another; it controls the relationship and determines the value of the other variable (the *dependent* variable). It is plotted on the x-axis of a graph.

$$y = 2x + 1$$

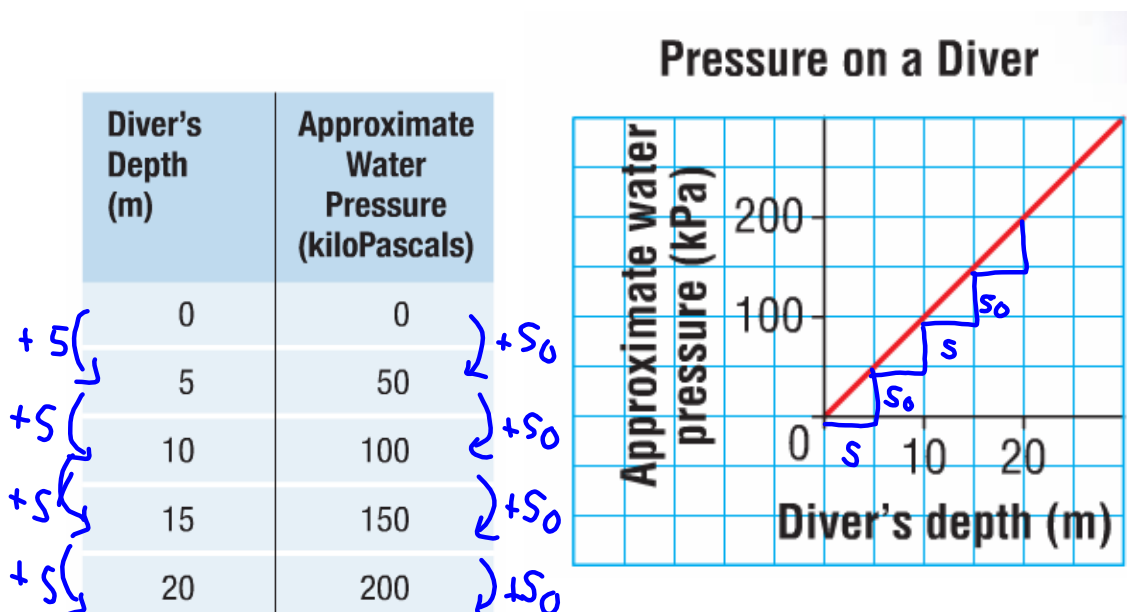
5. **RELATION:** A rule that relates two quantities. When two variables are related, we have a relation.  $y = 2x + 1$

6. **LINEAR RELATION:** A relation whose graph contains a straight line. In a linear relation, a constant change in one variable produces a constant change in the other.

x	y
+1	2.5
+1	2.5

**Example:** Please turn to page 164 in *MMS9*.

When a scuba diver goes under water, the weight of the water exerts pressure on the diver.



**What pattern do you see in the table?**

**As the diver's depth increases by 5 m, the water pressure increases by 50 kPa.**

**What pattern do you see in the graph?**

**The same pattern as in the table.**

**"Investigate", page 164 in *MMS9*:**

**Working with your assigned group, represent the relation between the total cost and the number of text messages sent in as many different ways as possible. Be prepared to share and discuss your findings.**

**REMINDER: "Discuss the Ideas", page 158:**

- "1. What different ways can you represent a between two quantities?"**  
**diagrams, words, tables of values,**  
**expressions, equations;**  
**new way: graph**

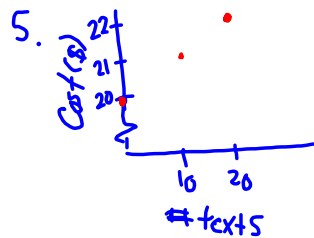
1. The cost of the phone is \$20 plus 10¢ for each text.

2.  $20 + 0.10x$

3.  $C = 20 + 0.10x$

4.

#texts	C
0	20
10	21
20	22



***In words:*** The total cost of the cell phone plan per month is equal to the number of text messages sent in one month multiplied by \$0.10 plus the fixed cost of \$20.

*In a table of values:*

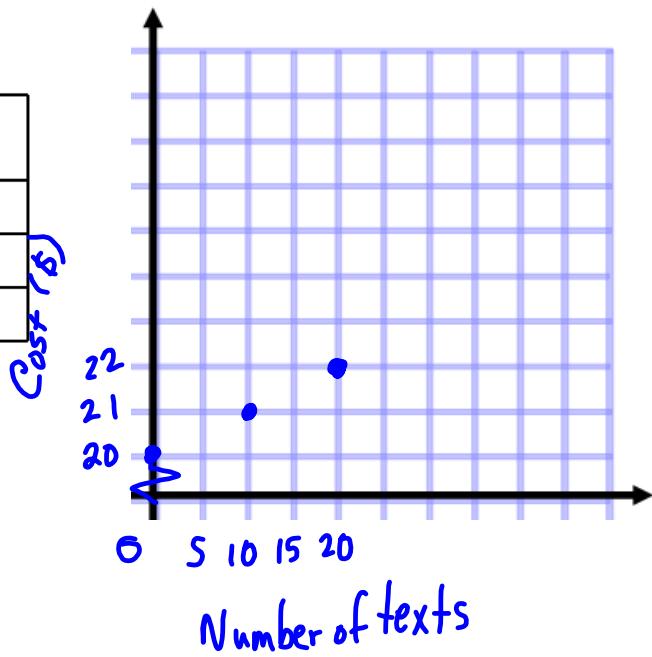
<b>Number of Text Messages Sent (n)</b>	<b>Total Cost (C)</b>
<b>0</b>	<b>20</b>
<b>10</b>	<b>21</b>
<b>20</b>	<b>22</b>

*In a table of values:*

<b>Number of Text Messages Sent (n)</b>	<b>Total Cost (C)</b>
<b>0</b>	<b>20</b>
<b>20</b>	<b>22</b>
<b>40</b>	<b>24</b>

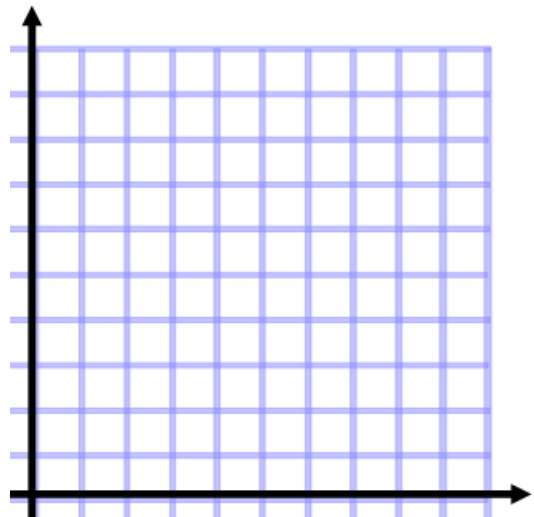
*In a graph:*

Number of Text Messages Sent (n)	Total Cost (C)
0	20
10	21
20	22



*In a graph:*

Number of Text Messages Sent (n)	Total Cost (C)
0	20
20	22
40	24



*Using an expression:*

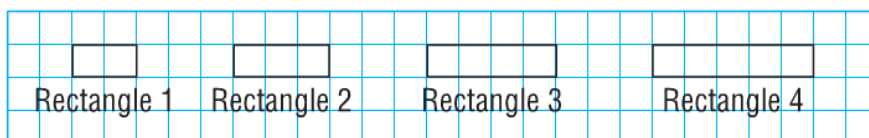
$$0.10n + 20$$

*Using an equation:*

$$C = 0.10n + 20$$

**PLEASE CLOSE YOUR TEXTBOOKS!**

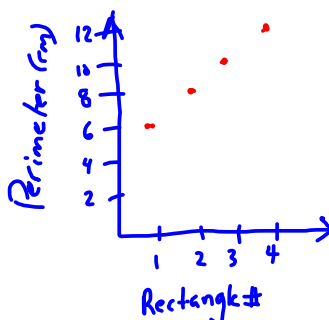
The first 4 rectangles in a pattern are shown below. The pattern continues. Each small square has a side length of 1 cm.



The perimeter (P) of a rectangle is related to the rectangle number (n). Working with your assigned group, represent this relationship using words, a table, a graph, and an equation.

r	P
Rectangle #	Perimeter
1	6
2	8
3	10
4	12

$P = 2r + 4$



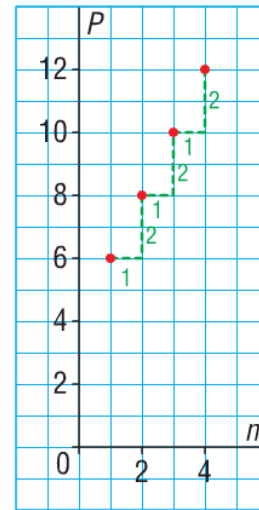


Please turn to pages 165 and 166 in *MMS9* to check your group's work.

In a Table

	Rectangle Number, $n$	Perimeter, $P$ (cm)	
	1	$6 = 2(1) + 4$	
+1	2	$8 = 2(2) + 4$	+2
+1	3	$10 = 2(3) + 4$	+2
+1	4	$12 = 2(4) + 4$	+2

Graph of  $P$  against  $n$



Work on...

'Graphing Ordered Pairs' worksheet

2 b) accurate read

