MARCH 23, 2016

UNIT 6: LINEAR RELATIONS

4.1: WRITING EQUATIONS TO DESCRIBE PATTERNS

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MATH 9

WHAT'S THE POINT OF TODAY'S LESSON?

We will continue working on the Math 9 Specific Curriculum Outcome (SCO) "Patterns and Relations 1" OR "PR1" which states:

"Generalize a pattern arising from a problem-solving context using linear equations and verify by substitution."

HOMEWORK QUESTIONS???

(PAGES 159 / 160, #4, 5, 8, 10 AND 13)

c e

13. c) / d) $p = 4n + 2$

e) $41 = 4n + 2$

$\frac{39}{4} = \frac{4n}{4}$

$9\frac{3}{4} = n$; so, we need 10 tables.

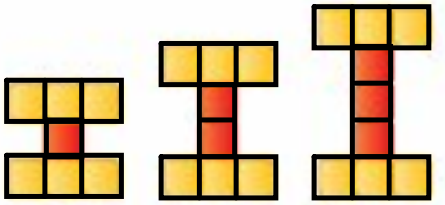
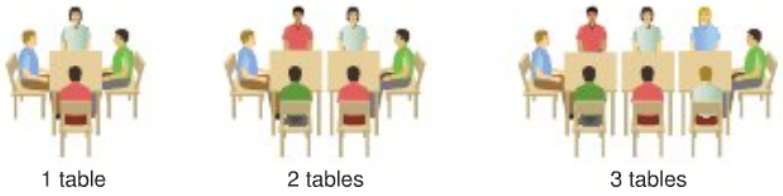


Figure 1 Figure 2 Figure 3

figure, *f*	tiles, *t*
1	7
2	8
3	9
4	10

+1 +1 +1 +1 +1 +1

$t = f + 6$



1 table 2 tables 3 tables

tables, *t*	people, *p*
1	4
2	6
3	8
4	10

+1 +1 +1 +2 +2 +2

$p = 2t + 2$

A landscape designer uses wooden boards as edging for the plots in an herb garden.

The number of boards ("b") is related to the number of plots ("p"). This relationship can be represented in different ways:

* **using pictures**
* **using a table of values**
* **using an equation**

Let's determine the equation using a table of values:

$b = 3p + 1$

Number of Plots, p	Number of Boards, b
1	4
2	7
3	10
4	13

+1 +1 +1 +3 +3 +3

Repeated addition of 3 is the same as multiplication by 3. Maybe b = 3p is a good place to start to determine the equation.

An airplane is cruising at a height of 10 000 m. It descends to land. The table below shows the height of the plane every minute after it began its descent.

Time (t minutes)	Height (h metres)
0	10 000
1	9 700
2	9 400
3	9 100
4	8 800

+1 +1 +1 +1 −300 −300 −300 −300

a) Write an expression for the height in terms of the time since the plane began its descent.
b) Write an equation that relates the height of the plane, h, to the time, t, since it began its descent.
c) What is the height of the plane after 15 min.?
d) How long after beginning its descent does the plane land?

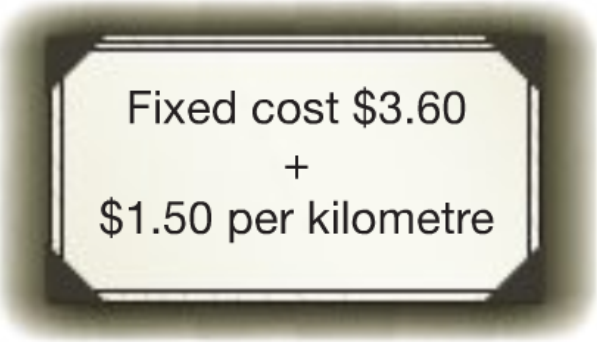
a) $10\,000 - 300t$

b) $h = 10\,000 - 300t$

c) $h = 10\,000 - 300t$
$h = 10\,000 - 300(15)$
$h = 10\,000 - 4\,500$
$h = 5\,500 \text{ m}$

d) $h = 10\,000 - 300t$
$0 = 10\,000 - 300t$
$0 + 300t = 10\,000 - 300t + 300t$
$\frac{300t}{300} = \frac{10\,000}{300}$
$t = 33.\overline{3}$
$t \doteq 33.3 \text{ min.}$

I called "Kelly's Cabs" for a taxi. The cost of a cab ride is shown on a poster in the cab:



a) **Write an expression for the fare in terms of fixedcost and the cost per km, *d*.**
b) **Write an equation that relates the fare, *f*, to the distance travelled, *d*.**
c) **What is the fare for an 11 km ride?**
d) **What is the distance traveled if the fare is $35.10 ?**

a) $1.50d + 3.60$

b) $f = 1.50d + 3.60$

c)
$$f = 1.50(11) + 3.60$$
$$f = 16.50 + 3.60$$
$$f = 20.10$$

The fare for an 11 km ride is $20.10 .

d)
$$f = 1.50d + 3.60$$
$$35.10 = 1.50d + 3.60$$
$$35.10 - 3.60 = 1.50d + 3.60 - 3.60$$
$$\frac{31.50}{1.50} = \frac{1.50d}{1.50}$$
$$21 = d$$

The distance traveled is 21 km.

PLEASE TURN TO PAGE 158 IN *MMS9*.

"Discuss the Ideas":

1. **diagrams, words, tables of values, expressions, equations**

2. **Diagrams provide good visual representation, but are difficult to use when patterns need to be extended.**

   Words will explain the relationship but may not be helpful in solving problems about the relationship.

   Tables of values provide an organized way of presenting the relationship, and the change can be easily identified, but they are not useful in determining a value that extends well beyond the information in the table.

   Expressions and equations are more difficult to find initially but help solve problems quickly once they are determined.

3. **a) Substitution of a matching pair of values into the equation. Make sure the left side (LS) equals the right side (RS).**

   b) Check the increase or decrease in the table first, then check the constant.

CONCEPT REINFORCEMENT:

MMS9:
PAGE 159: #7 and #9
PAGE 160: #12 and #14
PAGE 161: #15 to #17
PAGE 162: #20