Answer Key

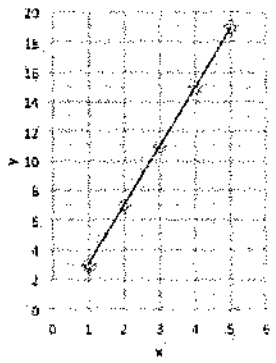
Patterns and Relations Review Booklet 2

1. Represent and describe patterns and relationships, using graphs and tables.
   - Translate a pattern to a table of values, and graph the table of values (limited to linear graphs with discrete elements).
   - Create a table of values from a given pattern or a given graph.
   - Describe, using everyday language, orally or in writing, the relationship shown on a graph.

Consider the graph below:

a. fill in the following table of values from the graph

x	y
1	3
2	7
3	11
4	15
5	19



b. From the graph predict the y – value when x = 9

$y = x4 - 1$ $\quad 9(4) - 1$ $\quad 36 - 1 = 35$

c. From the graph what is the x – value when y = 31

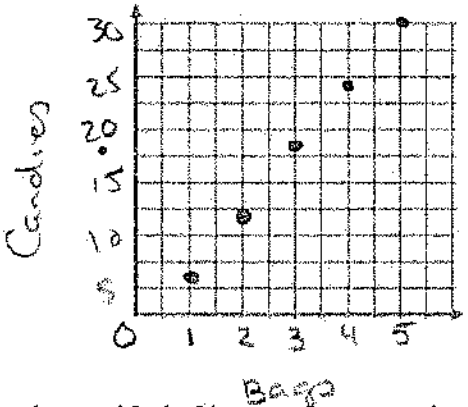
$31 = x4 - 1$ $\quad x = 8$

$32 = x4$

Lisa is filling candy bags for the school carnival, Lisa puts 6 candies in each bag.

a. Complete the following table:

Bags	Candies
1	6
2	12
3	18
4	24
5	30



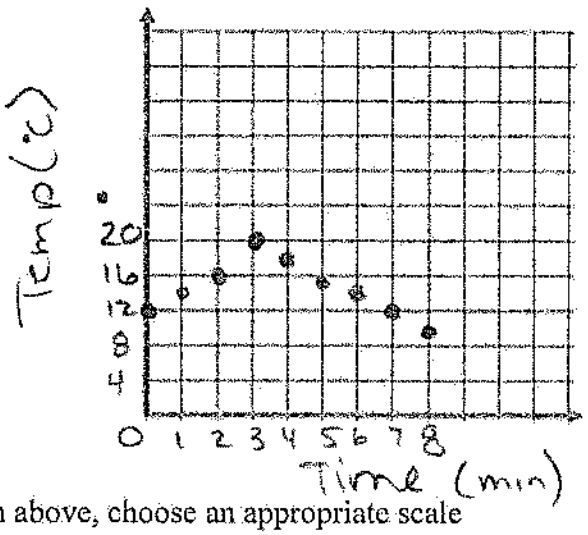
b. Graph the data above of the graph provided. Choose an appropriate scale.

c. Write an equation or an expression that shows the relationship between the number of bags and candies.

$y = x6$

Consider the data below:

Time (min.)	Temp (°C)
0	12
1	14
2	16
3	20
4	18
5	15
6	14
7	12
8	10



a. graph the data on the graph above, choose an appropriate scale
b. describe two conclusions that you could make from the graph

The temperature increases to 20°C then decreases back down below it's starting temp

2. Demonstrate an understanding of the relationships within tables of values to solve problems.
- Generate values in one column of a table of values, given values in the other column and a pattern rule.
- State, using mathematical language, the relationship in a given table of values.
- Create a concrete or pictorial representation of the relationship shown in a table of values.
- Predict the value of an unknown term, using the relationship in a table of values, and verify the prediction.
- Formulate a rule to describe the relationship between two columns of numbers in a table of values.
- Identify missing elements in a given table of values.
- Identify errors in a given table of values.
- Describe the pattern within each column of a given table of values.
- Create a table of values to record and reveal a pattern to solve a given problem.

Complete the following tables, fill in the missing numbers:

3 15.75
2 10.5
1 5.25

T-shirts	Cost ($)
4	21.00
5	26.25
6	31.5
10	52.5
14	73.50

A	B
2	14
3	21
4	28
8	56
12	84

$y = x 5.25$

a. what is the relationship between t-shirts and cost?
b. What is the relationship between A and B?

each shirt costs 5.25

b) x7

Look at the tables below:

- complete the table
- what is the rule used for each table?
- What is the output if the input is 8?
- Write an equation for each table.

a.

Input	Output	
1	5	) 3
2	8	) 3
3	11	) 3
4	14	) 3
5	17	
8	26	

$y = x3 + 2$

$y = 8(3) + 2$

$y = 26$

b.

Input	Output	
1	7	) 4
2	11	) 4
3	15	) 4
4	19	) 4
5	23	) 4
10	43	

$y = x4 + 3$

$y = 8(4) + 3$

$y = 35$

Use the following equations to complete each table:

a. $5n + 2$

Input (n)	Output
1	7
2	12
3	17
4	22
5	27
8	42

b. $4n - 1$

Input (n)	Output
1	3
2	7
3	11
4	15
5	19
10	39

3. Represent generalizations arising from number relationships, using equations with letter variables.
   - Identify the unknown in a problem where the unknown could have more than one value, and represent the problem with an equation.
   - Create a problem for a given equation with one unknown.
   - Identify the unknown in a problem; represent the problem with an equation; and solve the problem concretely, pictorially or symbolically.

The following formula can be used to calculate the **A** - area of a rectangle where **b** represents the base of a rectangle:

$$A = 12 \times b$$

Complete the table using this formula:

b (base)	2	4	6	8	10
A (area)	24	48	72	96	120

Peter is buying bottles of pop for his friends each bottle of pop cost $1.75. Complete the following table:

Bottles	2	3	4	5
Cost	3.5	5.25	7	8.75

Write an equation for this relationship:

$y = x(1.75)$

Use the following equation to solve the following problem. Dexter uses the following equation to calculate the number of floor tiles needed to cover a floor where:

n – number of tiles **A** - area

$A = 8\ n$

a. What is the area covered by 12 tiles?

$A = 12 \times 8$

$A = 96\ cm^2$

b. How many tiles are needed to cover a floor that has an area of 360 cm^2?

$360 \div 8 = 45$ (long division: 8 into 360; 32; 40; 40; 0)

45 tiles

4. Express a given problem as an equation in which a letter variable is used to represent an unknown number.
   - Identify the unknown in a problem where the unknown could have more than one value, and represent the problem with an equation.
   - Create a problem for a given equation with one unknown.
   - Identify the unknown in a problem; represent the problem with an equation; and solve the problem concretely, pictorially or symbolically.

Use a diagram to illustrate the following problems, then solve the equation:

a. $\frac{4n}{4} = \frac{32}{4}$

$n = 8$

b. $\frac{t}{3} = 21$

$21 \times 3 = t$

$t = 63$

Solve the following equations for the unknown variable:

a. $\frac{4n}{4} = \frac{12}{4}$

$n = 3$

b. $\frac{8a}{8} = \frac{40}{8}$

$a = 5$

c. $\frac{3x}{3} = \frac{18}{3}$

$x = 6$

d. $\frac{5y}{5} = \frac{35}{5}$

$y = 7$

e. $\frac{a}{4} = 6$

$a = 6 \times 4$

$a = 24$

f. $\frac{n}{3} = 9$

$n = 3 \times 9$

$n = 27$

g. $\frac{36}{w} = 4$

$w = 9$

h. $\frac{42}{z} = 6$

$z = 7$

5. Demonstrate and explain the meaning of preservation of equality, concretely and pictorially.
   - Model the preservation of equality for addition, using concrete materials (e.g., a balance, pictorial representations), and explain and record the process.
   - Model the preservation of equality for subtraction, using concrete materials (e.g., a balance, pictorial representations), and explain and record the process.
   - Model the preservation of equality for multiplication, using concrete materials (e.g., a balance, pictorial representations), and explain and record the process.
   - Model the preservation of equality for division, using concrete materials (e.g., a balance, pictorial representations), and explain and record the process.

Show that the following expressions are equal:

a. $4 + 12 = 12 + 4$

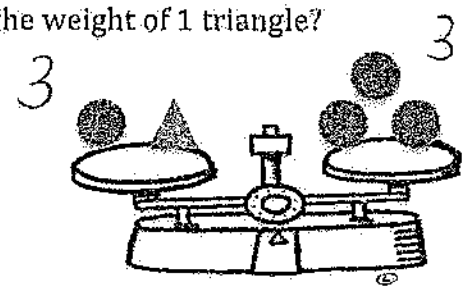
$16 = 16$

b. $8 + 44 = 44 + 8$

$52 = 52$

Solve the following balance questions:

a. what is the weight of 1 triangle?



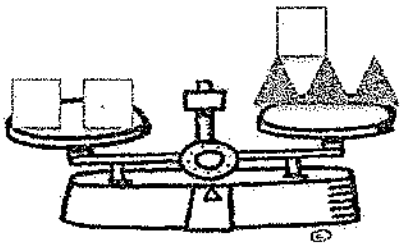
○ = 1

△ = 2

△ = ○○

b. what is the weight of 1 square?

□ = △△△



c. what is the weight of 1 square in terms of circles?

□ = ○○○○○○

△ = ○○