**Patterns & Real-World Examples – *Lesson***

***Background Info:***

Remember, the purpose of developing the equation for a pattern is so that we can easily find out term values in the pattern without creating a t-chart or graph.

There are many real-world examples where linear patterns exist and it is helpful for us to create an equation so that we can solve these problems.

We will examine how to use y=mx+b to solve real world linear problems

***Example #1:***

The teacher is organizing a field trip to the roller rink. It **costs $65 to rent out** the party room for students to put their bags and eat lunch. It also **costs $4 for each student** attending so they can borrow roller skates.

Let’s examine this example.

1. How much would it cost to go if 0 people rented skates?
2. How much would it cost to go if 1 person rented skates?
3. How much would it cost if 2 people rented skates?

Let’s put it into a table of values to better see the linear pattern:

Notice how the number of people is on our x-side of our table of values? The # of People is our term #.

Notice how the cost is on the y-side? The Total Cost ($) is our term value.

**m =?**

|  |  |
| --- | --- |
| **# of People** | **Cost ($)** |
| 0 |  |
| 1 |  |
| 2 |  |

4) What is our pattern number/slope? 5) What is our value at term 0 (y-intercept)?

6) ***Y = m x + b*** If m = slope/pattern number and b = term 0 value/y-intercept, what is our equation for this linear pattern?

Let’s use the equation to find the cost for the trip with different numbers of people attending. Remember, the # of People is our term number, so we substitute these numbers in for our x, then we solve for y.

7) How much would it cost if 10 people went? 8) How much would it cost if 25 people went?

***Review of Example:*** Let’s analyze the equation one more time to make sure we “get it”

Y = 4x + 65

The 65 is our **y-intercept.** This is the value that **would exist if 0 people had gone or 0 things had happened**. It is a 1-time cost.

The 4 is our pattern number or **slope**. This is the number that would be **repeatedly added or subtracted in the problem.**

**Problems for Practice:**

1. Gio recently paid $35 for a membership to join a fitness center. His favourite activity at the fitness center is Squash, which costs him an additional $7 each time he visits.

1 – what is the one-time fee he must pay each month?

2- What is the amount that would be repeatedly added to his bill every time he went to play squash?

3 – How much will it cost Gio if he plays squash:

Twice in the month? 3 times in the month?

4 – Create an algebraic expression so that Gio could calculate his total costs easily.

5 – Calculate the cost of Gio’s monthly bill if he plays squash:

 8 times this month. 15 times this month.

1. Joan got 100 chocolate eggs at Easter. She decides to eat 5 eggs per day from the box, starting today.
2. Create a table of values to show the first 5 terms.

|  |  |
| --- | --- |
| **# of Days** | **# of Eggs Left** |
| 0 |  |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |

2) Create an algebraic expression to represent this pattern.

3) How many eggs would she have left after 5 days?

4)How many eggs will she have left after 16 days?

5) How long will it take her to finish eating all 100 eggs?