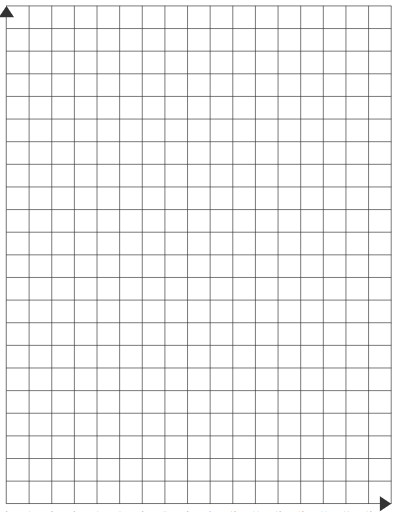
|  |
| --- |
| **Movie Night**  There are two payment options for downloading movies from a Web site:  **Option A:** Pay $10 for a membership and $2 per movie downloaded.  **Option B:** Pay $4 per movie download. |

a) Fill out the chart below then graph each option on the Cartesian plane.



**# of movies**

0 2 4 6 8 10 12 14 16

4 8 12 16 20 24 28 32 36

**COST ($)**

|  |  |  |
| --- | --- | --- |
|  | **OPTION A** | **OPTION B** |
| **# of MOVIES** | **COST ($)** | **COST ($)** |
| 0 | = 10 + 2 x 0  = $10 | = 4 x 0  = $0 |
| 2 |  |  |
| 4 |  |  |
| 6 |  |  |
| 8 |  |  |
| 10 |  |  |
| 12 |  |  |

b) Determine the equation for each option in y = mx + b form.

m = slope (rate per movie) b = initial cost (where graph starts on y-axis)

|  |  |
| --- | --- |
| **OPTION A** | **OPTION B** |

c) Determine **under which conditions** a person should select Option A and under which conditions a person should select Option B.

**LINEAR MODELS**

|  |
| --- |
| Tables, graphs and equations are all examples of **mathematical models.**  **KEY WORDS**  Constant  Equal  First differences  Straight line  y = mx + b  slope  vertical  constant  initial  rate of change  Represent quantities that increase or decrease by a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ amount over \_\_\_\_\_\_\_\_\_\_\_ intervals   * In a table of values, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are equal. * The graph is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * The equation of the line can be written in the form \_\_\_\_\_\_\_\_\_, where m is the \_\_\_\_\_\_\_\_ and b is the \_\_\_\_\_\_\_\_\_\_ intercept (y-intercept) * The rate of change (slope) is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * The vertical intercept represents the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ value of the ***dependent*** variable * The slope represents the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the ***dependent*** variable with respect to the ***independent*** variable |

***EXAMPLE 1*** Which models represent linear relations?

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  |  | | --- | --- | | **Time (s)** | **Height (m)** | | 0 | 60 | | 1 | 55 | | 2 | 40 | | 3 | 15 |   \* *Find 1st differences* | |  | | |  |  | | --- | --- | | **Time (h)** | **Earnings ($)** | | 0 | 0 | | 5 | 40 | | 10 | 80 | | 15 | 120 | | |
|  |  |  | |  | |
|  |  |  | |  | |

***C:\Users\Vicki\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\MK0D7N5K\MC900239561[1].wmfEXAMPLE 2:*** A cup of coffee is reheated in a microwave. The temperature, *C* degrees Celsius, of the coffee after *t* seconds can be modelled by the following linear equations. Explain what the numbers in the equations represent. How do the two equations compare to each other?

***500 W microwave:  1000 W microwave: ***