Direct Variation Exploration Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Congrats! You’ve just been hired at FedEx, and your job is to help determine how to load the delivery trucks. Your first task is to stack boxes that are each 12 inches high.**

****1) Complete the table and make a graph of the data points.

|  |  |
| --- | --- |
| **Number of Boxes****(x)** | **Height of the Stack****(y)** |
| 0 |  |
| 1 |  |
| 2 |  |
|  | 60 |
| 6 |  |
|  | 96 |

2) What pattern(s) do you notice about the data in the table?

3) What are TWO things you notice about your graph?

 a. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 b. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4) a. Does the **number of boxes** (the **x** value) ALWAYS stay the same? Yes No

 b. Does the **height of the stack** (the **y** value) ALWAYS stay the same? Yes No

 c. The only value that ALWAYS stays the same is the **height of each box**, which is \_\_\_\_\_\_\_\_\_ inches.

 This is the **CONSTANT OF VARIATION (a.k.a. constant of proportionality)**, or the **k** value. Since this is the

 **amount per 1** item, it is also the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

5) A direct variation EQUATION is written as **y = kx**, where **k** is the **constant**. Since your **constant** is **12**, your

 equation is y = \_\_\_\_\_\_\_x

6) a. Which value is your **dependent** variable? \_\_\_\_\_\_\_\_ Why?

 b. Which value is your **independent** variable? \_\_\_\_\_\_\_\_ Why?

7) The height of the stack **depends** on the number of boxes you have! You can also see that as the number of

 boxes **increases**, the height of the stack also \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This is always true with a **direct variation**!

8)What does the point (0,0) mean on your table and graph?

9) **Great job so far! Now, your boss gives you this graph. Use the graph to fill in the table and write the**

 **equation!**

 **Here’s your graph: Fill in the data table: Find the equation:**

|  |  |
| --- | --- |
| **Number of Boxes****(x)** | **Height of the Stack****(y)** |
| 0 |  |
| 1 |  |
| 2 |  |
|  | 30 |
| 6 |  |
|  | 150 |
| 18 |  |



 What’s the height of

 1 box?

 The height of 1 box

 is your constant, k.

 So, what is your

 equation?

**y = \_\_\_\_\_\_x**



10) **This time, the boss lady gives you the equation. If each of these boxes is 5 inches tall,**

 **fill in the table and graph your data! Pay close attention to the numbers in the table!!**

  **Here’s your equation: Fill in your data table: Complete your graph:**

|  |  |
| --- | --- |
| **Number of Boxes****(x)** | **Height of the Stack****(y)** |
| 0 |  |
|  | **8.5** |
| 4 |  |
| 5 |  |
| 8 |  |
|  | 85 |



 **y = 8.5x**

 What’s the height of 1 box?

11) Mrs. Bosslady asks you to compile data on boxes with these heights: 5.25 inches, 3.9 inches, and 9.5 in.

 Their equations: y = 5.25x

 y = 3.9x

 y = 9.5x

 a. On your graphing calculator, go to Y= and type in the three equations above. What do you see/notice?

 b. Which equation gives a steeper line? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Why?

12) The last type of item you are preparing to package is a set of traffic cones. Each cone is a total of 30

 inches tall. However, when stacked, only the base of each cone will add to the height, except for the cone

 on top. Each base is 2 inches tall. Fill in the table of values and graph it. Also, determine the equation.



 Fill in the table: Graph your data:

|  |  |
| --- | --- |
| **Number of Cones****(x)** | **Height of the Stack****(y)** |
| 0 |  |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |













 What is the equation? Be careful on this one! ☺

 Is this a direct variation? Explain your answer.