Warmup $10/\left(\frac{\sin x}{\sin x} + \frac{2\pi^2}{2\pi^2} + \frac{\cos x}{\cos x} + \frac{\tan x}{\tan x} + 13 - \frac{10\pi^2}{2\pi^2}\right)$

Created by Max Robinson (student from last year)

- Bill had 50 cookies in a tub. He gave two cookies to each classmate.
- Write an equation to represent how many cookies Bill has left.
- 2. The inputs (x) would represent _____
- 3. The outputs (y) would represent _____
- The slope is _____ and it represents _____
- The y-intercept is ____ and it represents ____

The table from the cookies situation is shown to the right. Suppose you had to graph this on the graph shown below. DISCUSS: How could you SCALE your yaxis so that all of the y-values will fit on the graph? (The grid is 14 by 14)



| x | У |
|---|----|
| 0 | 50 |
| 1 | 48 |
| 2 | 46 |
| 3 | 44 |
| 4 | 42 |
| 5 | 40 |

Go over HW, collect Warmups

Write an equation, make a table, and draw a graph.

Example

A tree was planted when it was 5 feet tall. Each year, it grew 3.5 more feet.

$$y = 3.5x + 5$$

- INPUTS (x): # of years
- OUTPUTS (y): height of tree
- SLOPE: Growth in feet per year
- Y-INTERCEPT: original height

| x (years) | y (height) |
|-----------|------------|
| 0 | 5 |
| 1 | 8.5 |
| 2 | 12 |
| 3 | 15.5 |
| 4 | 19 |
| 5 | 22.5 |

REMEMBER:

IN A REAL-WORLD SITUATION

- Slope = Rate of change
- Y-intercept = original amount

Write an equation, make a table, and draw a graph.

Each month, Bob's phone plan charges a \$10 flat fee, plus \$0.05 per text message sent.

$$\Box y = 0.05x + 10$$

- INPUTS: # of texts
- OUTPUTS: total cost
- SLOPE: cost per text
- Y-INTERCEPT: flat fee (cost for 0 texts)

| x | У |
|---|-------|
| 0 | 10 |
| 1 | 10.05 |
| 2 | 10.10 |
| 3 | 10.15 |
| 4 | 10.20 |
| 5 | 10.25 |



To Connect or Not To Connect?

Refresher: WHY do we connect the points for a normal function?



We connect the points of a normal equation because we want to show that the equation could work for ALL numbers – not $\frac{1}{10}$ just the ones in our table. I could plug in a decimal for "x" if

I wanted to!

To connect or not to connect?

You must pay \$10 per t-shirt plus a flat shipping fee of \$6.

 $\Box y = 10x + 6$

| x (# of shirts) | y (total cost) |
|--------------------|-------------------|
| 1 | 16 |
| 2 | 26 |
| 3 | 36 |
| 4 | 46 |
| 5 | 56 |



To connect or not to connect?

The temperature is 6 degrees and it is rising 10 degrees per hour. 70

 $\Box y = 10x + 6$

| x (# of hours) | y (temper- ature) |
|-------------------|----------------------|
| 0 | 6 |
| 1 | 16 |
| 2 | 26 |
| 3 | 36 |
| 4 | 46 |
| 5 | 56 |



TO CONNECT OR NOT TO CONNECT???

- For a normal equation, you should always connect the points, because "x" could be any number.
- For a story problem, you don't always connect the points, because the decimals don't always make sense for "x".
- Ask yourself one question: DO THE NUMBERS IN BETWEEN MAKE SENSE???
 - If yes, connect. (<u>Continuous</u> graph)
 - If no, do not connect. (Discrete graph)

Should we have connected these?

<u>Example</u>

A tree was planted when it was 5 feet tall. Each year, it grew 3.5 more feet.

$$y = 3.5x + 5$$

Yes, you can have fractions of a year

| x (years) | y (height) |
|-----------|------------|
| 0 | 5 |
| 1 | 8.5 |
| 2 | 12 |
| 3 | 15.5 |
| 4 | 19 |
| 5 | 22.5 |

Should we have connected these?

 Bill had 50 cookies in a tub. He gave two cookies to each classmate.
x (classmates)

No, you can not have fractions of a classmate. The graph doesn't continuously go from 50 to 48; it happens instantaneously

| x (classmates) | y (cookies left) |
|----------------|------------------|
| 0 | 50 |
| 1 | 48 |
| 2 | 46 |
| 3 | 44 |
| 4 | 42 |
| 5 | 40 |

Should we have connected these?

Each month, Bob's phone plan charges a \$10 flat fee, plus \$0.05 per text message sent.

$$y = 0.05x + 10$$

No, you can not have fractions of a text. The cost does not go up gradually from \$10.00 to \$10.05, it goes up instantaneously

| x | у |
|---|-------|
| 0 | 10 |
| 1 | 10.05 |
| 2 | 10.10 |
| 3 | 10.15 |
| 4 | 10.20 |
| 5 | 10.25 |

FINAL NOTE about connecting points

Sometimes, in your textbook, or in another problem, you might see the points connected, even if it technically wouldn't make sense.

They do this because connecting the dots can help you see the overall trend better.

HOMEWORK: Linear Situations Worksheet

When creating the graphs, DO NOT just use the numbers in your table as your scale. You should scale it by something "common", like 5s, or 10s, or 20s.

Your x and y-axis do NOT need to use the same scale.