#### **Created by Charlotte Kelly**

## Warmup $9/(-1 \cdot 6^4 + 1296) + (4 \cdot 6)$

#### (This is Week 8!!!)

- 1) Pick two of the graphs and explain why they are SIMILAR. Use mathematical vocabulary.
- 2) Pick a different pair of graphs and explain why they are similar.
- 3) Show work to verify why the problem in the date is correct.









#### Honorable Mentions: Sept. 23

Jalen H:  $30^2 - 877$ Braylon W:  $2\sqrt{100} + 3$ Jacob D: 20 - 1 + 2 - 3 + 4 - 4 + 5

#### Honorable Mentions: Sept. 24

- Avi K: The age you're allowed to vote + the last digit of the # you can start to drive without a permit
- Kennedi B:  $(.5 \times 14) \times (-1 + 4) + 3$
- **Reily G: The year we graduate high school!**
- Saoirse G: 4!
- **Maggie L:**  $5(2^2) + double$  the # of siblings Mr. Lischwe has

#### **NEW UNIT!**

#### In the last unit, we learned about ALL DIFFERENT types of functions...

# • Functions with an x<sup>2</sup> term make parabolas...



 Functions with absolute value make a "v" shape...



•Functions with a square root make this shape...



 Functions with a variable as an exponent make this shape...



 Functions with "sin" and "cos" make wavy graphs...



# ...and functions with the form x + make straight lines!



#### In this unit...

• We are going to now focus exclusively on **linear** graphs. These are probably the most common, and useful, type of function.

Anything that has a <u>constant rate</u> is linear!

## Go over HW

#### **Table of Contents**

- p. 1 Converting Fractions and Decimals (1.1)
- p. 2 Roots (1.8 & 1.9)
- p. 3 Solving  $x^2$  and  $x^3$  Equations (1.8)
- p. 4 Rational vs. Irrational (1.1)
- p. 5 What is a function?
- p. 6 Function Notation: f(x)
- p. 7 Linear vs. Nonlinear Functions
- p. 8 Constant Rate of Change

#### **Constant Rate of Change**

**Objectives:** 

- -Determine if a situation has a constant rate of change
- -(If it does, you know it will be a straight line!)
- -Calculate WHAT the rate of change is

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#### Are the trees growing at a constant rate???

Years	Height of tree	
4	17	
5	21	
6	25	
7	29	
8	33	
(1e5) 9 #/	Year	
Years	Height of tree	
Years 4	Height of tree	
Years 4 5	Height of tree 17 > 3 20 > 6	
Years 4 5 6	Height of tree $17 \rightarrow 3$ $20 \rightarrow 5$ $25 \rightarrow 7$	
Years 4 5 6 7 7	Height of tree $17 \rightarrow 3$ $20 \rightarrow 5$ $25 \rightarrow 7$ $32 \rightarrow 7$	

Years	Height of tree
4	17
6 17	21 )+4
8 7+7	25 7+4
10	29 +4
12 )+2	33
$\frac{4ft}{2yr} = \frac{2ft}{1yr}$	Yes; Z ft/year

 On Monday, Gary had \$65 saved up. By Saturday, Gary \$95 saved up. How many dollars per day did Gary save in this span of time?

$$$95 - $65 = $30$$
  
 $M_{001} \rightarrow 50t = 5days$   
 $$30 = $6 per dax$ 

#### Remember UNIT RATES???

• Unit rate = per year, per minute, per shirt, etc.

• 42 dollars 6 shirts

 $\bullet = \frac{7 \ dollars}{1 \ shirt}$ 

The table shows the average temperature (°F) for five months in a certain city. Find the rate of change for each time period. During which time period did the temperature increase at the fastest rate?

Month:	2	4	5	8	9
Temp (°F)	54	61	67	76	78

Is the rate of change constant?



Months 2-4: 3.5 degrees per month Months 4-5: 6 degrees per month Months 5-8: 3 degrees per month Months 8-9: 2 degrees per month

Not constant!

Month:	2	4	5	8	9
Temp (°F)	54	6	67	76	78



 Anne was reading a book. She wrote down what page she was on at various times:

Time	Page
1:45	0
1:50	15
2:00	45
2:03	54
2:19	102

- Was she reading at a constant rate?
- If so, what is the rate?
- If not, when was she reading faster or slower?

 Anne was reading a book. She wrote down what page she was on at various times:



- Was she reading at a constant rate? Yes
- If so, what is the rate?
   3 pages per minute
- If not, when was she reading faster or slower?

Time	Page
1:45	0
1:50	15
2:00	45
2:03	54
2:19	102





Rate of Change = <u>change in y (output)</u>
 change in x (input)

## THIS IS THE MOST IMPORTANT FORMULA OF THE ENTIRE NEXT MONTH!!!

Here is an x/y table. Is the rate of change constant?



• Here is an x/y table. Is the rate of change constant?



Here is an x/y table. Is the rate of change constant?



#### Homework

• p. 175 (1 – 6, 10, 11)