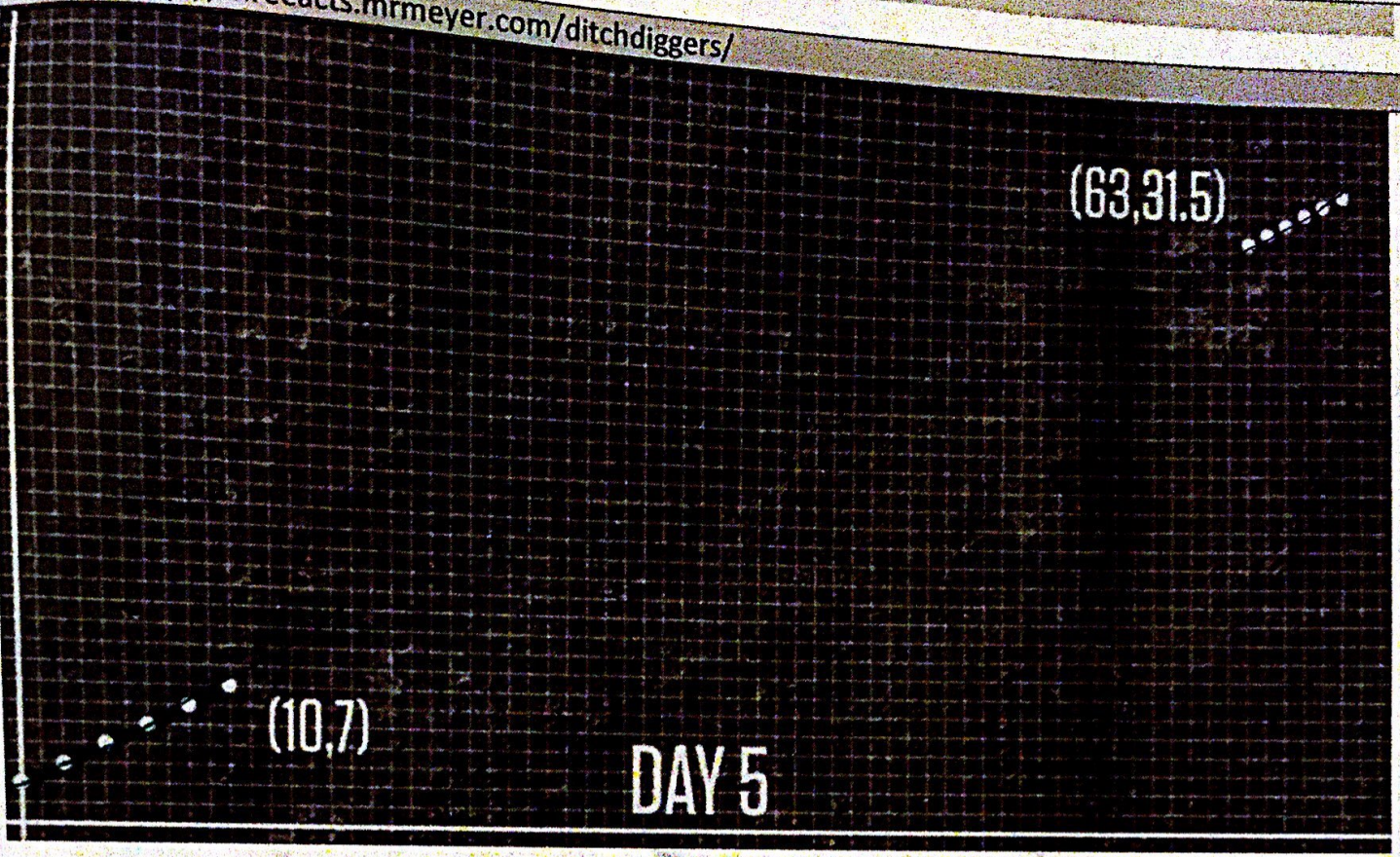
Notes: Graphing Lines Using Intercepts

Part 1: http://threeacts.mrmeyer.com/ditchdiggers/



What do you notice? What are some questions you have?

Seems One is going faster than the other - Are they going at a constant speed?

- What is the distance they cover each day?
- At what point do they start?
- Are they both working at the same time?

How long will it take to connect?

	Ditch Digger One
Day 0	(0,2)
Day 1	(2,3)
Day 2	(4,4)
Day 3	(6,5)
4	(8,6)
5	(10,7)

How would you describe where each digger would be at the end of each day?

For every change in 2 x, the y changes by 1.

How could you describe this change?

$+\frac{1}{2}$ $\frac{y\text{ change}}{x\text{ change}}$

For every change in x the y-changes by 0.5

$\frac{0.5}{1}$ Down

Ditch Digger Two	
(68,34)	Day 0
(67,33.5)	Day 1
(66,33)	Day 2
(65,32.5)	Day 3
(64,32)	4
(63,31.5)	5
(62,31)	6

DEFINITION: ***SLOPE: a ratio of vertical change to horizontal change of a line.***

between 2 points

↑↓ change / → left to right change

$m = \frac{\text{rise}}{\text{run}}$

between 2 points, vertical change from left to right

describes the steepness of a line

SLOPE

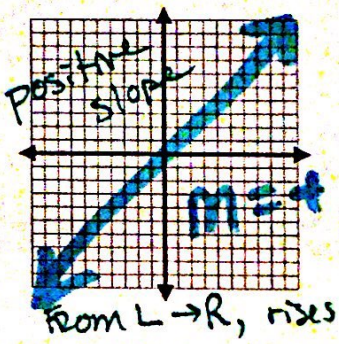
Rate of Change

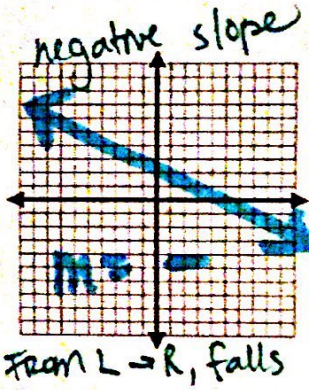
SLOPE FORMULAS

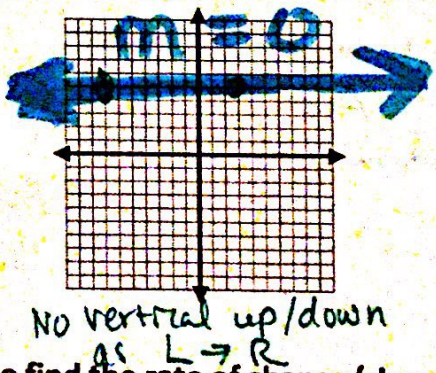
$m = \frac{y_2 - y_1}{x_2 - x_1}$

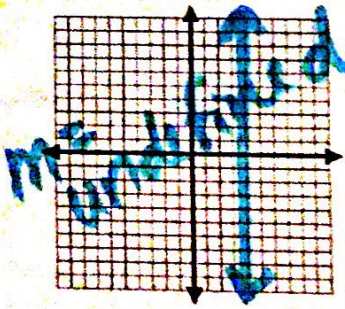
$y = mx + b$

- used in function form
(aka slope-intercept form)









In the ditch digger example, use the slope formula to find the rate of change/slope of each ditch digger?

- **Ditch Digger 1:**

- **Ditch Digger 2:**

Were the signs of the slopes the same or different? From the graph, how is this seen?

Example 1:

1. Calculate the rate of change (slope) of the ~~function~~ in the table. Give units and explain the meaning of the slope.

	Tickets for rides (tickets)	10	12	14	16
y	Total cost for carnival ($)	12.50	14.00	15.50	17.00

INDEP: x

(12, 14) x_1, y_1 (16, 17) x_2, y_2

$\frac{y_2 - y_1}{x_2 - x_1} = m$

$\frac{17-14}{16-12} = \frac{\$3}{4 \text{ tickets}}$

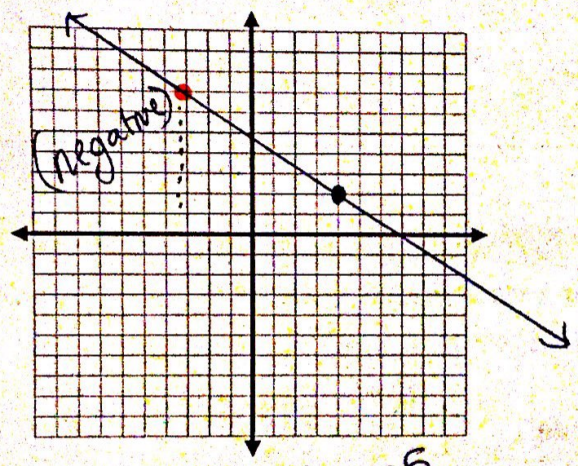
D. For every $3, you can afford 4 tickets.

How to find the slope between two points.

Two points: $(-3, 7)$ and $(4, 2)$ (x_1, y_1 and x_2, y_2)

From a graph...

1. Plot the two points.



2. Find the vertical change. : −5
   - Start at point on the LEFT to get to the endpoint on the right.
   - Count vertical units:
     - If you moved up, it's a positive change.
     - If you moved down, it's a negative change.
3. Count horizontal units: how many units do you move to the right? 7
4. Express as a fraction: $\frac{\text{RISE}}{\text{RUN}}$ $= \frac{-5}{7}$

From a pair of coordinates...

1. Label each pair of points (x_1, y_1) and (x_2, y_2)
2. Use the slope formula

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2-7}{4-(-3)} = -\frac{5}{7}$$

3. Simplify if possible

$$m = -\frac{5}{7}$$

Plot the points and draw a line through them.
State wither the slope of the line is positive, negative, zero, or undefined.
Calculate the slope using the formula.

1. $(6,-8),(6,4)$

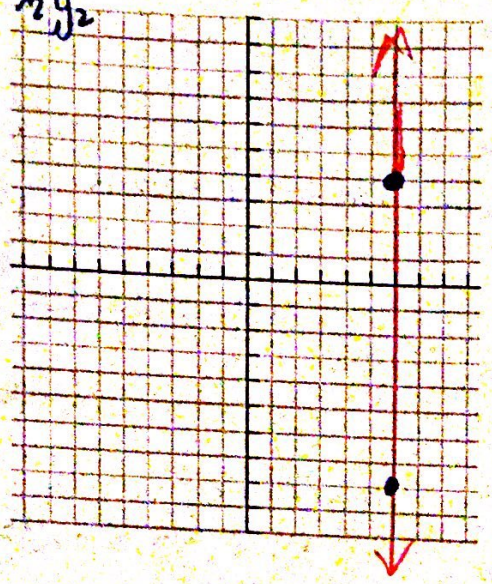
Using Slope Formula: x_1, y_1, x_2, y_2

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{4 - -8}{6 - 6}$$

$$m = \frac{12}{0}$$

undefined slope

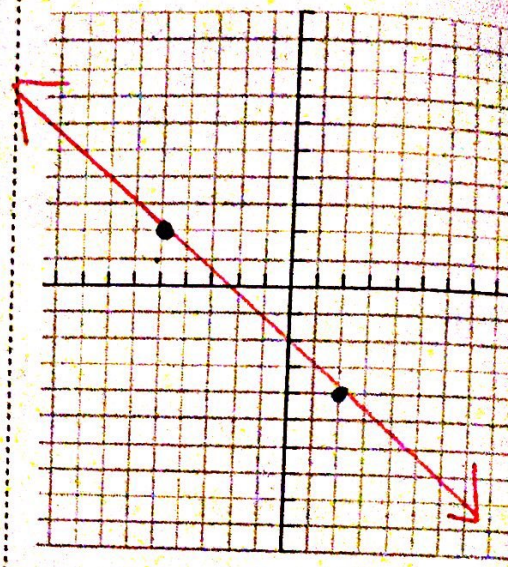


2. $(-5,2),(2,-4)$

Using Slope Formula: x_1, y_1, x_2, y_2

$$m = \frac{-4 - 2}{2 - -5}$$

$$m = \frac{-6}{7}$$



Exit Ticket:

- Roll a pair of dice. The die on the left will be your x-coordinate, and the die on the right will be your y-coordinate. Write this coordinate here: (,)
- Repeat this, except make each coordinate negative.
- Write this coordinate here: (- , -)
- Find the slope between these points. Plot these points to confirm the slope.