1.3

Rate of Change

Topics:

1. Slope Formula
2. Slope as a Rate of Change
3. Creating Graphs

Jun 27-10:03 AM

Key Terms

*rate of change

* dependent variable

* independent variable

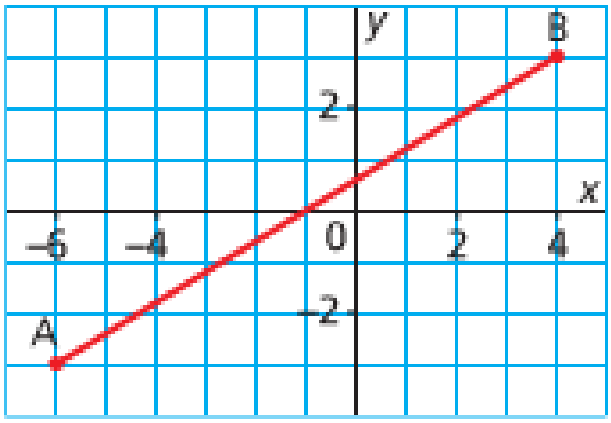
* zero slope

* undefined slope

Jun 27-9:37 AM

Slope Formula

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



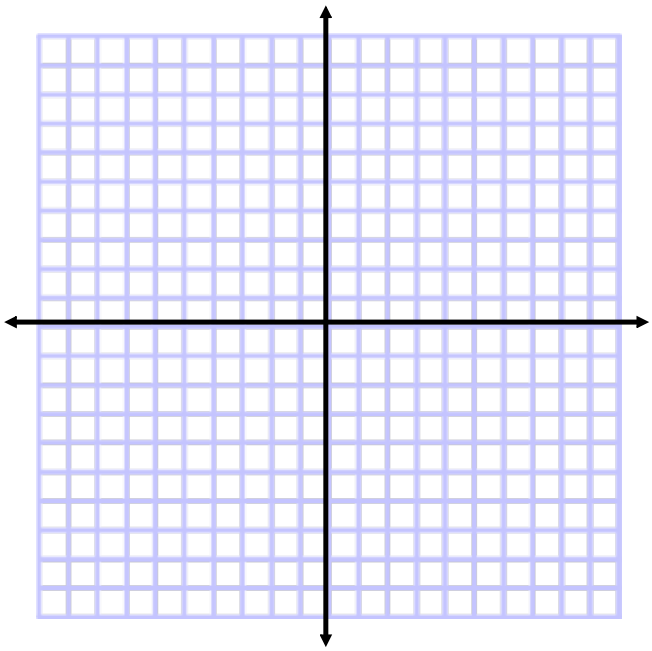
Use this formula when

you are given the coordinates

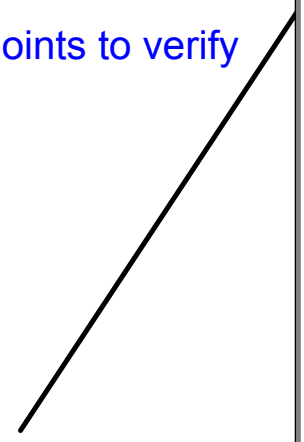
of two points

Find the slope between the points A(1,-4) and B(5,2)

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



Lets graph the points to verify our answer



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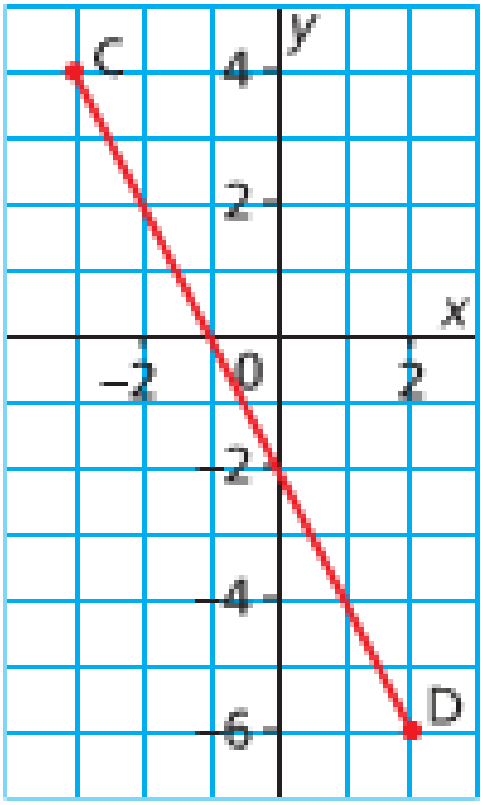
Find the slope

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



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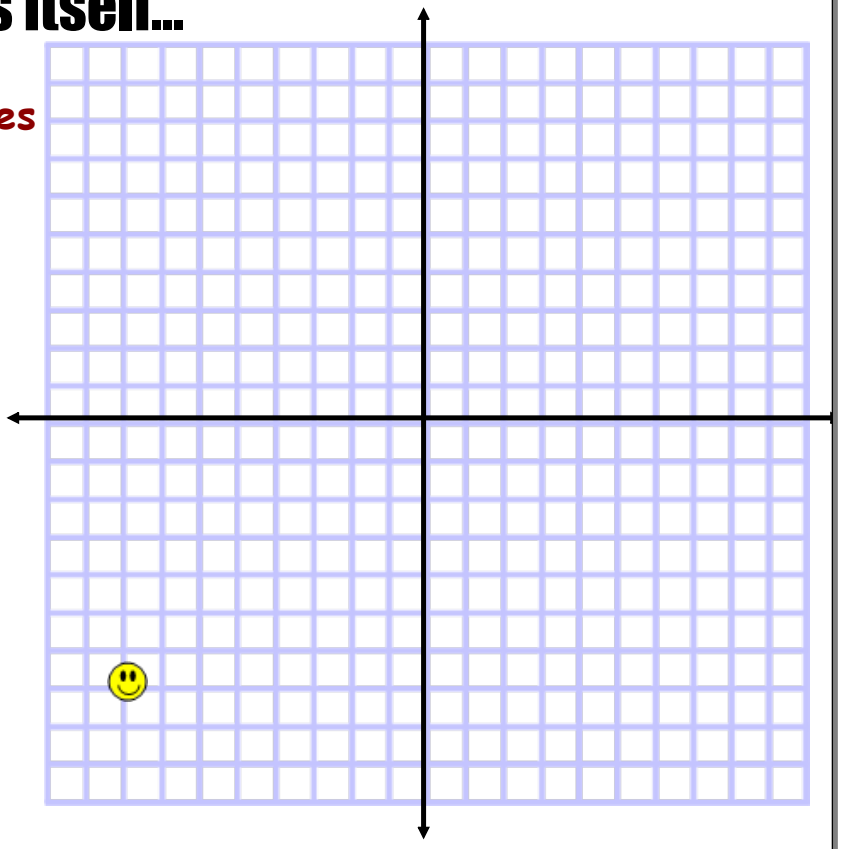
The pattern repeats itself...

Draw the line that passes through the happy face and has a slope of 4/3



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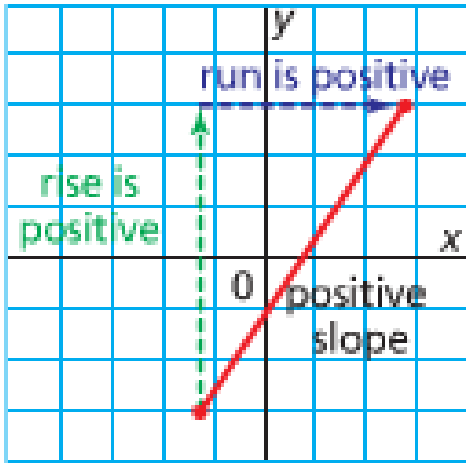
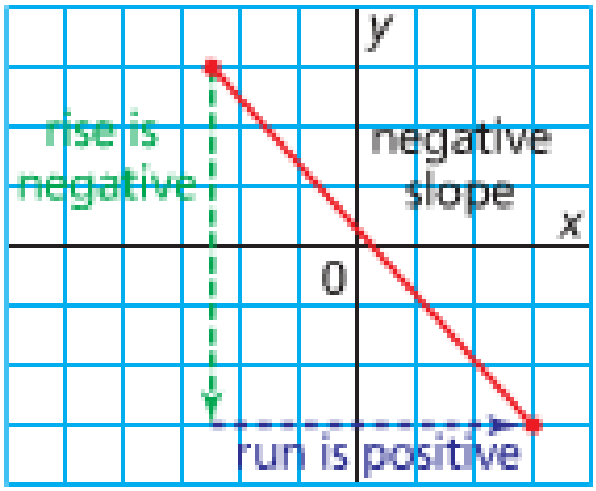
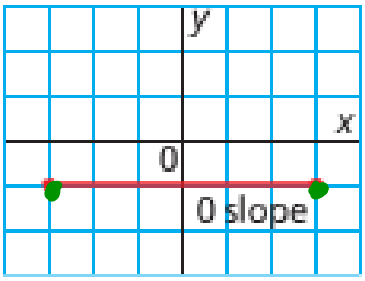
Positive Slope



Negative Slope



Zero Slope

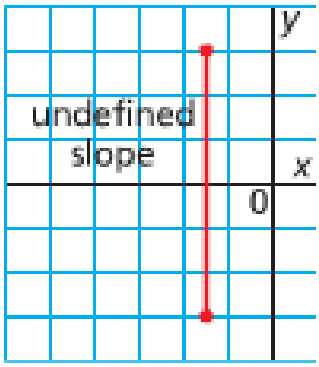


$$\text{slope} = \frac{\text{rise}}{\text{run}}$$

$$\text{slope} = \frac{0}{\text{run}}$$

slope = 0

Undefined Slope

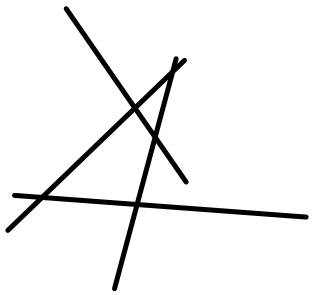


$$\text{Slope} = \frac{\text{rise}}{\text{run}}$$

$$\text{Slope} = \frac{\text{rise}}{0}$$

Match the line with the slope

slope = 1 slope = 4 slope = $\frac{-1}{10}$ slope = $\frac{-3}{2}$



May 27-2:28 PM

Your turn...

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Build Your Skills

1 - 3

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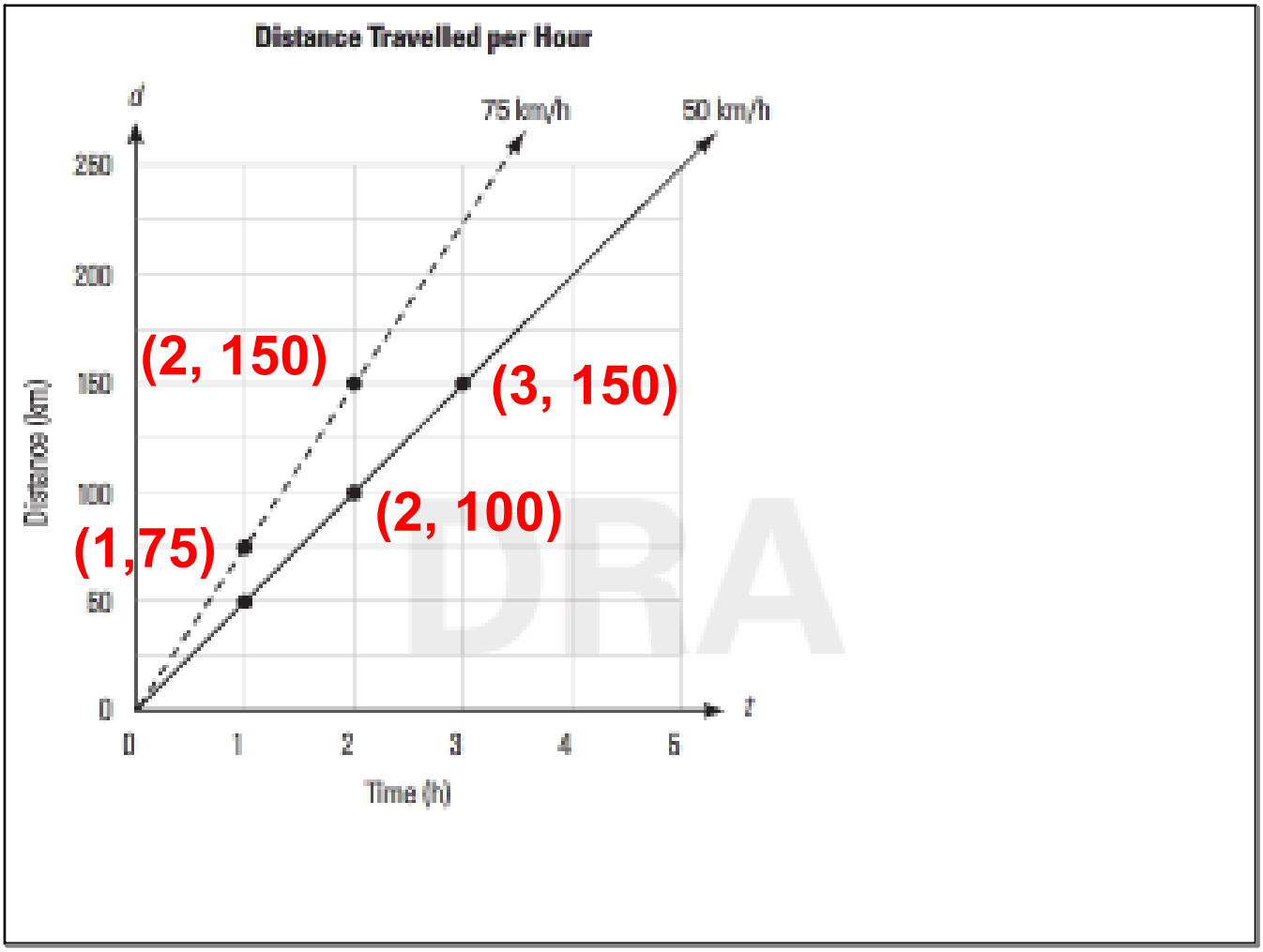
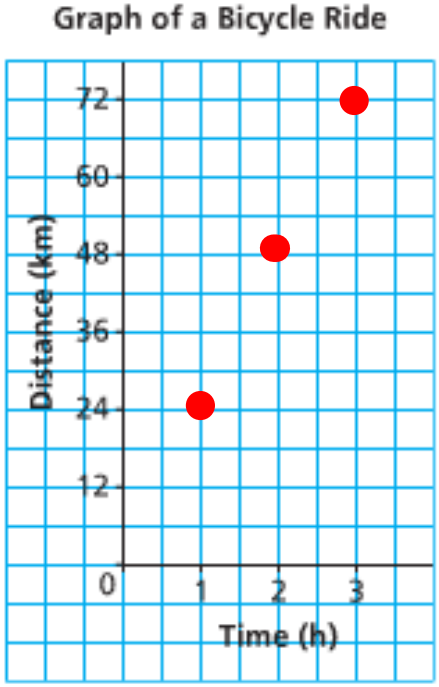

Distance Travelled per Hour
d
75 km/h
50 km/h
250
200
150
100
50
0
Distance (km)
(2, 150)
(3, 150)
(2, 100)
(1,75)
t
0
1
2
3
4
5
Time (h)

Slope as a Rate of Change



Yvonne recorded the distances she had travelled at certain times since she began her cycling trip along the Trans Canada Trail in Manitoba, from North Winnipeg to Grand Beach. She plotted these data on a grid.

Definitions (in your workbook):

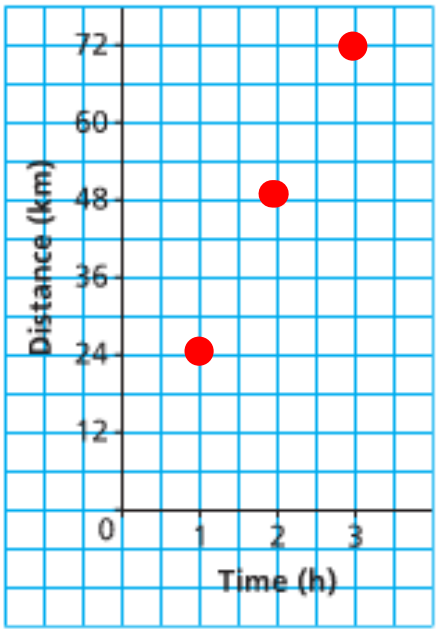
rate of change

independent variable

dependent variable

Should you join the dots with a line?

Graph of a Bicycle Ride



a) What is the slope of the line through the points?

b) What does the slope represent?

c) How can the answer to part b be used to determ
i) how far Yvonne travelled in $1\frac{3}{4}$ hours?

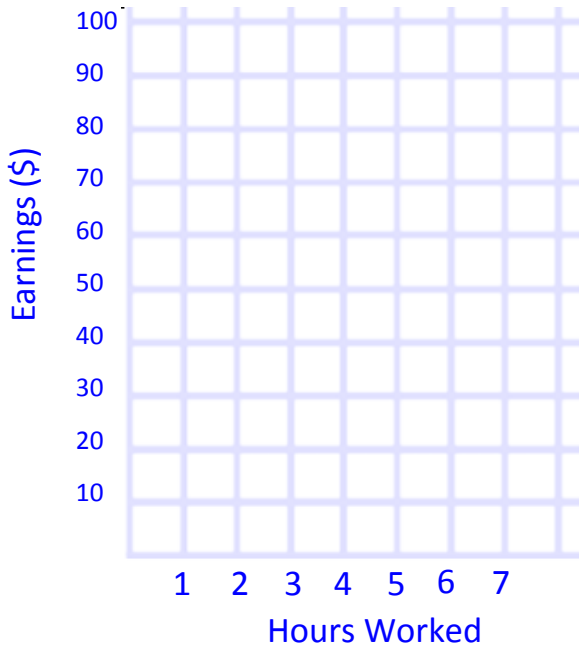
ii) the time it took Yvonne to travel 55 km?

Example

Willard works as an electrician's assistant and earns $12.25 per hour.

a) What is the dependent variable? Write an equation that shows the relationship between hours worked and income.

b) Graph the equation



continued...

c) What is the slope of the graph and what does it represent?

d) How much will Willard earn in 5 hours?

e) If he earned $183.75 on a job, how many hours did he work?

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Your turn...

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Build Your Skills

4, 5, 6

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Example

Nick and Sergio are laying shingles on a new roof. Nick laid 8 shingles after 11 minutes and 31 shingles after 66 minutes. Sergio laid 4 shingles after 7 minutes and 29 shingles after 57 minutes.

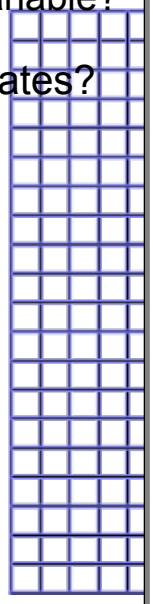
a) Which would be the independent variable and the dependent variable?

b) How could you represent Nick and Sergio's work as coordinates?

c) Graph Nick and Sergio's work on the same graph.

d) Find the rates at which Nick and Sergio are working.

e) How many shingles would each man lay in 5 hours?



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Example

Christian is a plumber, and she needs to drain a full 170 L hot water tank. After 6 minutes, there were 130 L left in the tank.

a) Draw a graph with the y-axis labelled 0 - 180 L and the x-axis labelled 0 - 30 minutes. Plot the first two points.

b) Calculate the slope. What does this slope mean?

c) Extend the line all the way down to the x-axis. Pick two differen points and calculate the slope. What do you notice?

d) How much water will be left after 12 minutes?

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e) How much water will have drained in 18 minutes?

f) How long will it take to completely drain the tank?

g) Create an equation for draining this hot water tank using ***w*** for the amount of water and ***t*** for time.

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Your turn...

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Build Your Skills

 # 7, 8, 9

Crossword Puzzle

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Practise Your New Skills

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 # 1 - 7 all

Graph paper at the back of the room

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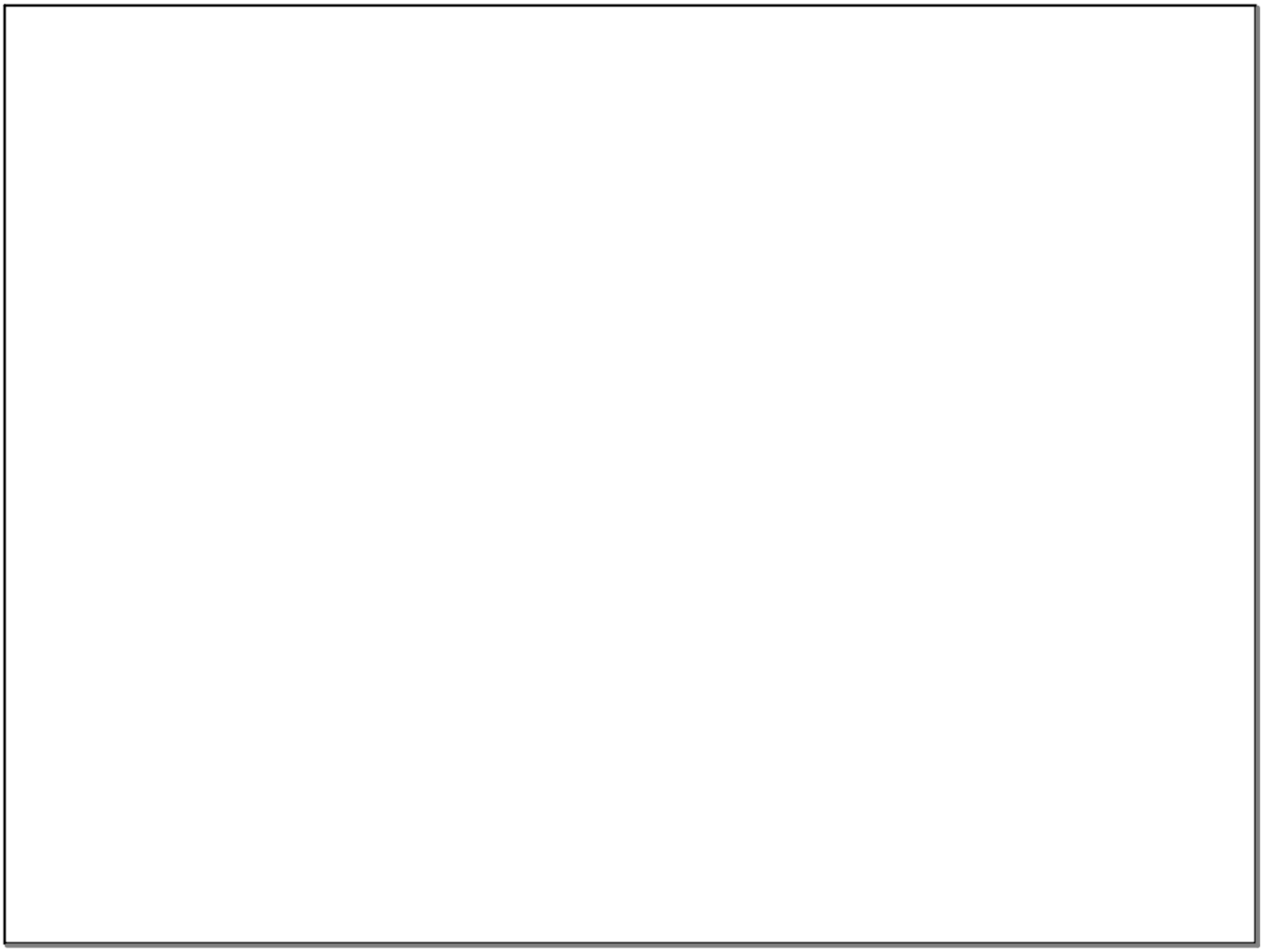

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