

## 2.1: Graphs

MATH 30 -  
Spring 2017

Plot ordered  
pairs and  
determine the  
coordinates of  
a point

Number lines  
Cartesian  
coordinate  
system

Graph paired  
data

Read graphs

Find the  
midpoint of a  
line segment

# 2.1: Graphs

## Graphs, Equations of Lines, and Functions

MATH 30 - Spring 2017

California State University, San Marcos

Brian Vargas

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- Be sure to write down all of the examples worked out on the board completely and step-by-step.
- Make certain that you can follow the logic and understand the sequence of the steps.
- Don't worry about copying down everything on the slides. Just jot down the key points.

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# Number Lines

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MATH 30 -  
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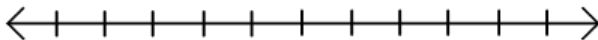


Figure: Number Line Skeleton

Label and graph the following:

$$\left\{\frac{5}{3}, -2, 0, 3, -3.65\right\}$$

# Objectives

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# Cartesian Coordinate System

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MATH 30 -  
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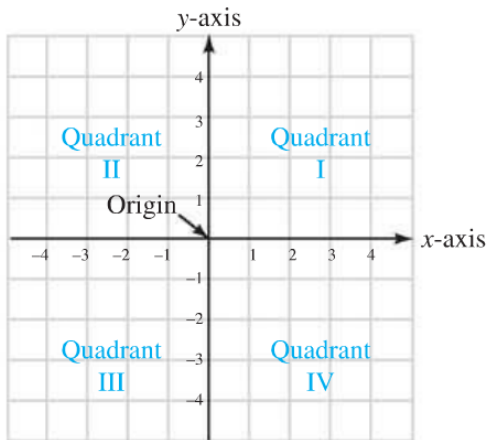


Figure: Labeled Coordinate Plane

# Ordered Pairs

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MATH 30 -  
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- Each point on the coordinate plane can be written as ordered pair  $(x, y)$ .
- The process of marking a point in the coordinate plane is called plotting.



# Ordered Pairs

## Example

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MATH 30 -  
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Plot the following coordinates:

- $(0,0)$
- $(3,2)$
- $(0,3)$
- $(-5,0)$
- $(0, -\frac{8}{3})$
- $(2.5,0)$
- $(6,-4)$
- $(-4,6)$

Identify the corresponding quadrants.

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- Many real-world applications:
  - Distance traveled depending on speed
  - Money earned depending on hours
  - Sales tax paid depending on item price
- Graphs can be used to visualize such relationships.
  - $x$  independent variable
  - $y$  dependent variable

# Graph Paired Data

## Example

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MATH 30 -  
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Time (seconds)	Height of rocket (feet)	
0	0	→ (0, 0)
1	80	→ (1, 80)
2	128	→ (2, 128)
3	144	→ (3, 144)
4	128	→ (4, 128)
5	80	→ (5, 80)
6	0	→ (6, 0)

Figure: Rocket Launch Table



# Graph Paired Data

## Instructions

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MATH 30 -  
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- 1 Identify the dependent and independent variables
- 2 Scale and label the graph
- 3 Plot the data
- 4 Draw smooth curve through the points

# Graph Paired Data

## Practice

### 2.1: Graphs

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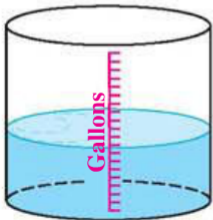
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- 35. Water Pressure.** A tub was filled with water from a faucet. The table shows the number of gallons of water in the tub at 1-minute intervals. Plot the ordered pairs in the table on a rectangular coordinate system and then draw a line through the points.



Time (min)	Water in tub (gal)
0	0
1	8
2	16
3	24
4	32



# Read Graphs

## Importance

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MATH 30 -  
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- Increasingly popular way to present information
- Ability to read and interpret is becoming ever more important

# Read Graphs

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MATH 30 -  
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Find the  
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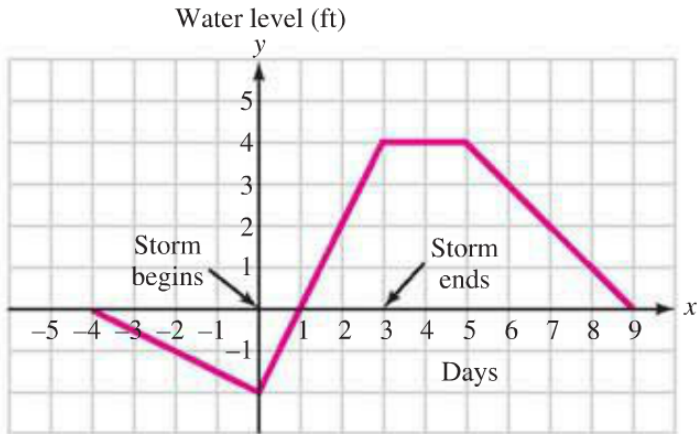


Figure: Water Level of Reservoir

# Read Graphs

## Example

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MATH 30 -  
Spring 2017

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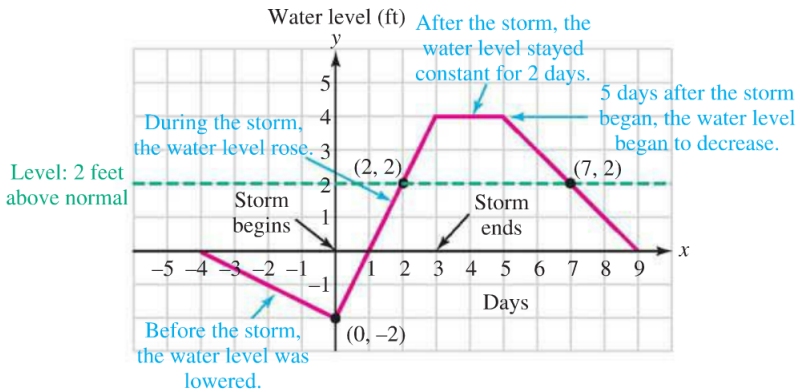


Figure: Labeled Water Level of Reservoir



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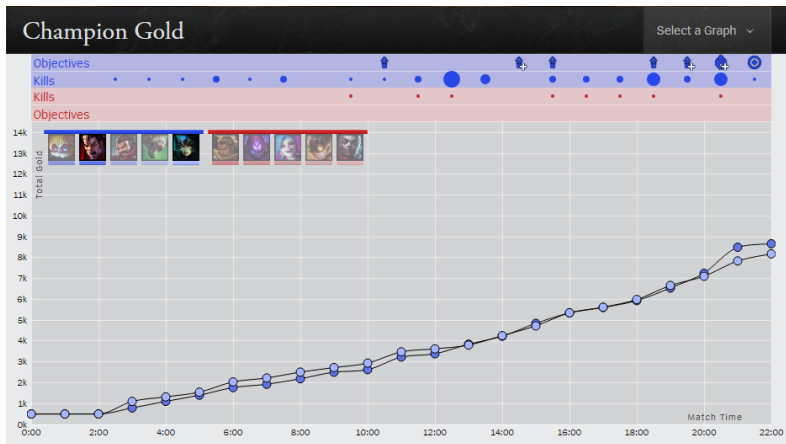


Figure: Match History - Nami vs Darius

# Read Graphs

## Step Graph Example

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Spring 2017

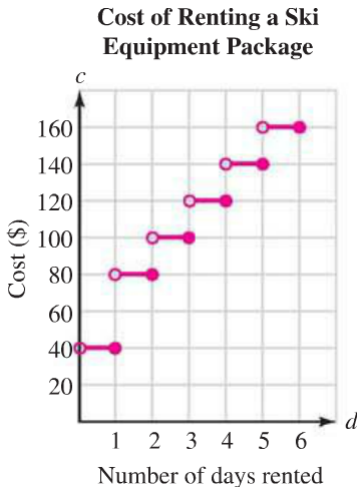
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# Read Graphs Practice

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MATH 30 -  
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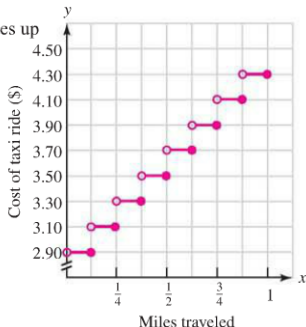
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40. **Taxis.** The following graph gives the fares charged for rides up to 1 mile in length by a taxicab company.

- What is the fare for a  $\frac{1}{2}$ -mile ride?
- Is the fare the same for each  $\frac{1}{8}$  mile traveled?
- What is a fare for a  $\frac{7}{10}$ -mile long ride?



# Midpoint

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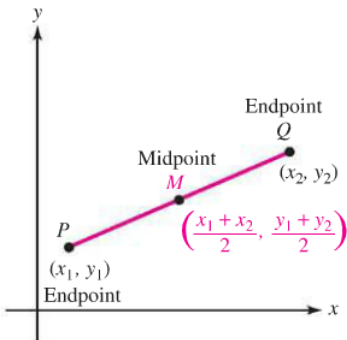


Figure: Midpoint Diagram

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## The Midpoint Formula

The midpoint of a line segment with endpoints  $(x_1, y_1)$  and  $(x_2, y_2)$  is the point with coordinates

$$\left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$



# Midpoint

## Examples

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- 1 Find the midpoint of  $(-2, 5)$  and  $(4, -2)$ .
- 2 Find the missing endpoint:  
endpoint  $(3, 2)$  with midpoint  $(1, 1)$ .



# Midpoint Practice

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- 1 Find the midpoint of the line segment with endpoints  $(0, 0)$  and  $(6, 8)$ .
- 2 If  $(-2, 3)$  is the midpoint of a line segment with endpoint  $(-8, 5)$ , find the missing endpoint.