GAM

Day 6

Review quiz: Areas

- What are the formulas for area of :
- 1. Rectangle
- 2. Square
- 3. Triangle
- 4. Parallelogram
- 5. Trapezoid
- 6. Circle (and Heron's formula)
- 7. Pyramid*
- When would you use Heron's formula?

Review quiz : Solid Geometry

- 1. What is a right prism?
- 2. Explain the difference between surface area and lateral (surface) area.
- 3. What is the formula for the volume of a right prism with a rectangular base?
- 4. What is the surface/lateral area and volume of a right circular cylinder
- 5. What is the surface/lateral area and volume of a sphere

Review: Solid Geometry

- Polyhedron
- Prism
- Cylinder
- Sphere
- Surface Area
- Lateral (Surface) Area

Solid Geometry

- What is a pyramid
- What is a regular pyramid

Chapter 9

Analytic Geometry

Cartesian Coordinate System

Obj.- To plot points

To graph lines

To find distance between two points

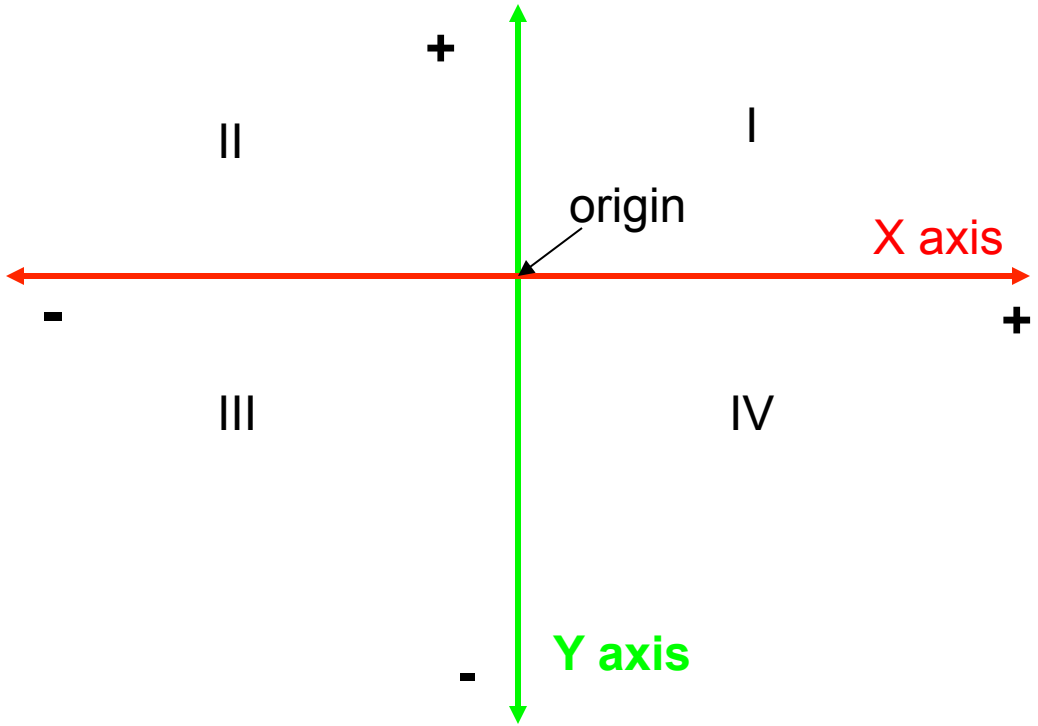
To find the midpoint of a line segment

To determine and use slope

To complete proofs using coordinate geometry

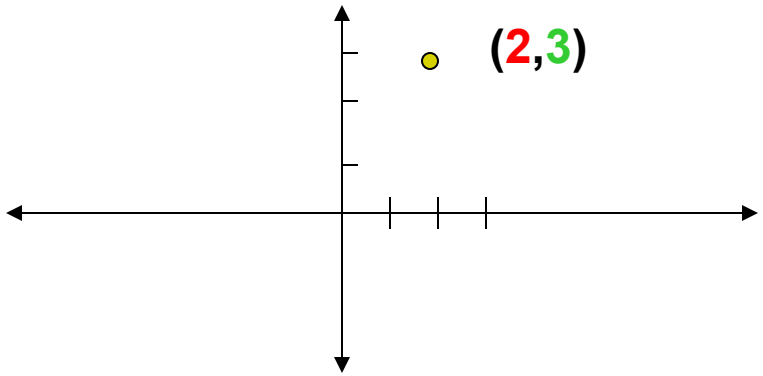
Cartesian Coordinate System

Associated with each point in the plane there is one and only one ordered pair of numbers.



Plotting points

- Ordered pairs are in the form (x_1, y_1)
- To plot a point, move parallel to x-axis first then move parallel to they axis.



- We plot points that satisfy an equation in two variables in order to construct the geometric figure that corresponds to the equation

Linear Equations

- General Form of a linear equation where a, b, and c are integers.

$$ax + by + c = 0$$

- An example of a linear equation is

$$3x-y-2=0$$

- To graph this figure you find ordered pairs that make the statement true.

Substitution method of graphing a line

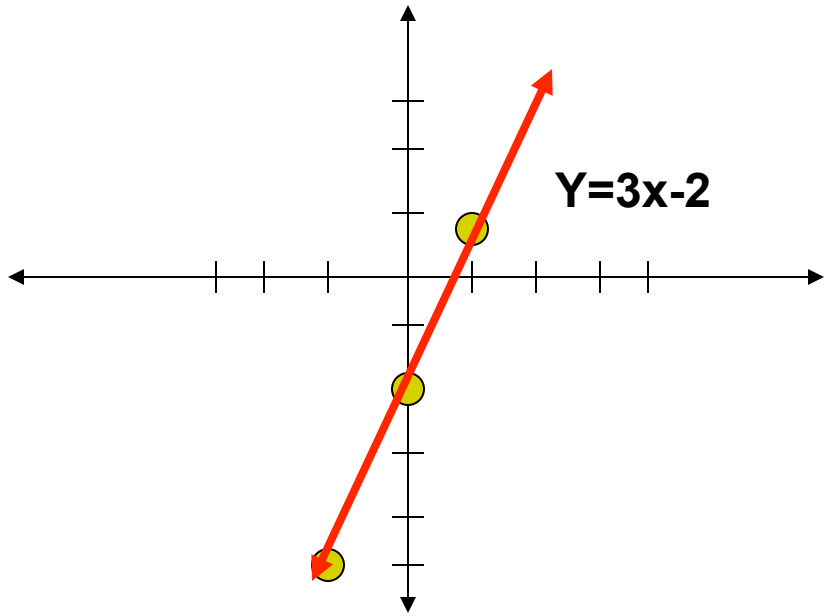
Select values for X and solve for Y. Most of the time you need to transform the equation so it is in terms of Y. This makes the process easier.

3x-y-2=0 or y=3x-2

X	Y
0	-2
-1	-5
1	1

Plot the points from the chart

- Make three substitutions and plot the three ordered pairs. Then draw a line through all points. If they are not on a line you made an error with your substitutions.



Graphing lines using intercepts

- An intercept is the point where the graph crosses an axis.
- To use intercepts in graphing, substitute 0 in for x and solve for y for the first order pair (0, y).
- Next, substitute 0 in for y and solve for X for (x,0).
- Graph the two points and draw a line through the points.

Intercept method

- Given 3x-5y-15 =0

X	Y
0	
	0

- Complete the table and graph

Distance in between two points

- The distance between two points is calculated using the Pythagorean Theorem.
- The formula for distance between (x_1, y_1) and (x_2, y_2) is stated below.

- $d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$

Midpoint formula

- The midpoint of a line segment joining (x_1, y_1) and (x_2, y_2) is stated below.

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

- The x-coordinate of the midpoint is the average of the x-coordinates of the points, and the y-coordinate of the midpoint is the average of the y-coordinates of the points.

Slope

- Let $P(x_1, y_1)$ and $Q(x_2, y_2)$ be two points on a non-vertical line. The slope of the line is
-
- $$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\text{change in y coordinates}}{\text{change in x coordinates}} = \frac{\text{rise}}{\text{run}}$$

$$\text{for } x_2 \neq x_1$$

Example

- Find the slope of the line passing through the points (-3, 2) and (1, -1).

Point Slope Form of linear equation

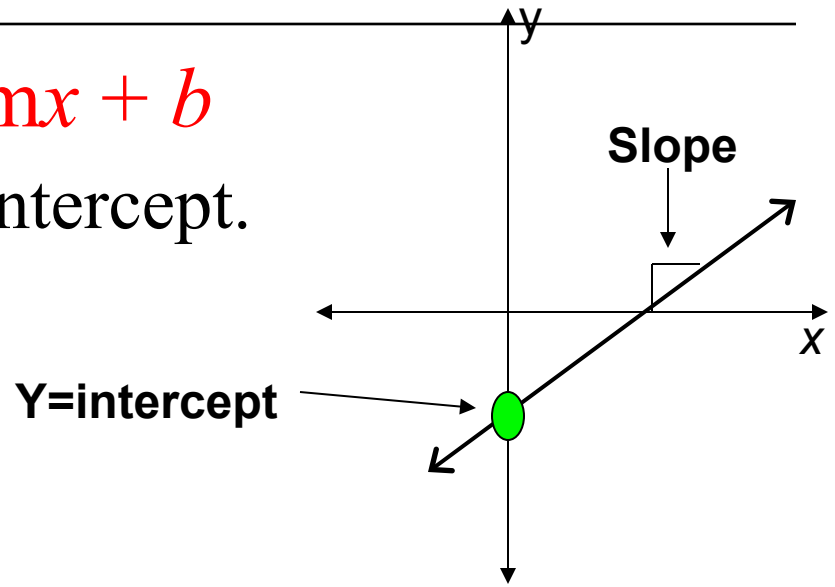
- The equation of a line with slope ***m*** and passing through the point (x_1, y_1) is determined using the point slope form.

$$y - y_1 = \boldsymbol{m}\,(x - x_1)$$

Slope Intercept form of a line

- Slope Intercept Form $y = mx + b$

where m=slope and b is the y-intercept.



- Usually you must transform the equation before graphing to isolate the slope (m) and the y intercept (b).

Example

- Graph the equation $y = -2x + 7$ using the slope intercept method.

What slopes tell us

- Th. 9.3 Two distinct lines with slopes m_1 and m_2 are parallel if and only if $m_1 = m_2$.

- Th. 9.4 Two lines with slopes m_1 and m_2 are perpendicular if and only if $m_1 m_2 = -1$.

Which lines are parallel/perpendicular?

L1: $Y = 2X + 21$

L2: $Y = \frac{1}{2} X - 84$

L3: $Y = -2X + 350$

L4: $Y = 2X + 58$

L5: $Y = -\frac{1}{2} X + 771$

L6: $Y = 2X$

L7: $Y = \frac{1}{2} X$

L8: $Y = -\frac{1}{2} X - 60$

L9: $Y = -2X + 39$

Bring calculator for next class

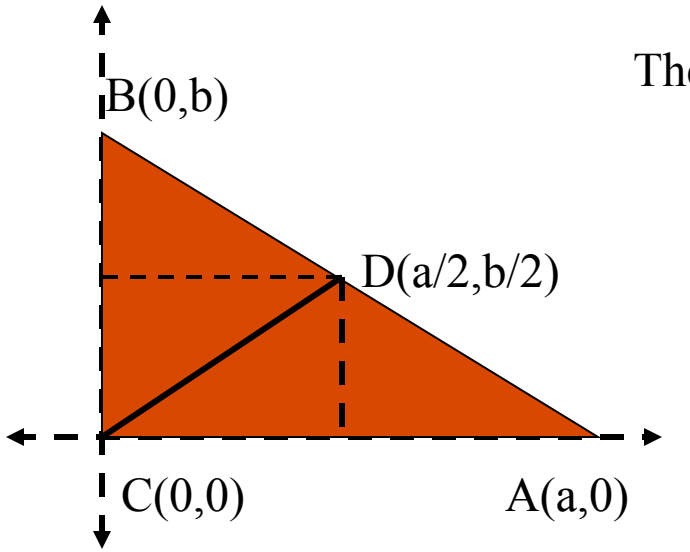
- We need calculator to study trigonometry functions (sin x, cos x, tan x) in the next class

Analytic Geometry PROOFS (made easy)

- Th. 5.16 The median from the right angle in a right triangle is one-half the length of the hypotenuse.

To Prove: Use midpoint formula on AB.

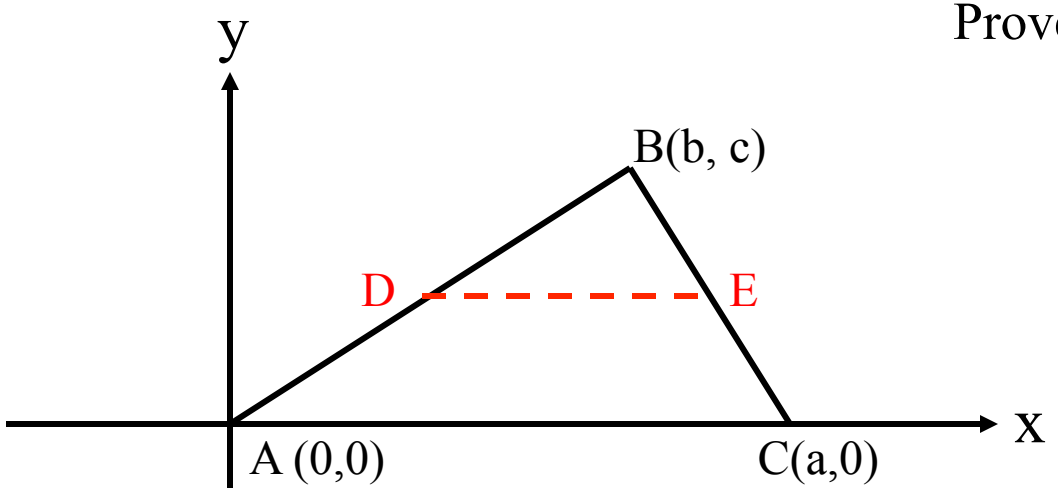
Then use Distance formula on CD and AB.



See page 446-449 for more examples.

Analytic Geometry PROOFS

- Th. 4.19 The segment joining the midpoints of two sides of a triangle is parallel to the third side and its length is one half the length of the third side



Prove that DE // AC
and DE = ½ AC

What did you learn today

- Surface area and volume of solids
- How to use slope to graph lines
- Midpoint and distance formulas
- Coordinate geometry proofs

Review for the Final

- Cartesian Coordinate System
- Distance
- Midpoint
- Slope
- Line equations
- Parallel lines
- Perpendicular lines

Assignment

- Read chapter 9

Assignment

- Read the following chapters for next class
  - Chapter 10
- Study for Final Exam (comprehensive)

End Day 6