REVIEW - Coordinate Geometry

Coordinate Geometry

- Finding the Slope of a Line:
  (1) Given 2 points on the line
  $$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$
  (2) Given the equation of the line
  $$y = mx + b$$

- Slopes of Special Lines:
- Horizontal Lines → $m = 0$
- Vertical Lines → *m is undefined (no slope)*
- Parallel Lines → have slopes that are **equal** to each other
- Perpendicular Lines → have slopes that are **negative reciprocals** to each other

- Finding Intercepts:
- *x* intercept → let $y = 0$
- *y* intercept → let $x = 0$ OR $y = mx + b$

- Finding the Equation of a Line:
  (1) Slope-Intercept Method
  $$y = mx + b$$
  (2) Point-Slope Method
  $$y - y_1 = m(x - x_1)$$

- Equations of Special Lines:
- Horizontal Lines → $y = constant$
- Vertical Lines → $x = constant$

- Forms of an Equation:
  (1) Slope-Intercept Form
  $$y = mx + b$$
  (2) ~~Standard~~ General Form
  $$Ax + By + C = 0$$
  - no fractions
  - # in front of "x" term is positive
  - set equal to zero

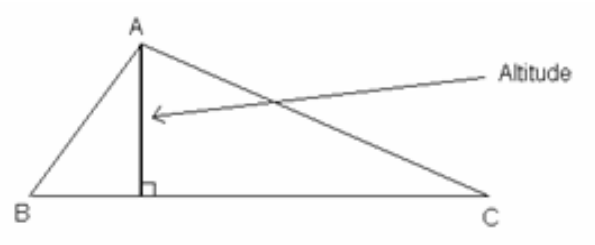
- Distance Between 2 Points:
  $$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

- Operations Involving Radicals:
- Simplifying → $\sqrt{a \times b} = \sqrt{a} \times \sqrt{b}$
- Addition / Subtraction → # under the radical sign (radicand) must be the **same**

- Midpoint of a Line:
  $$midpoint\ (x, y) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

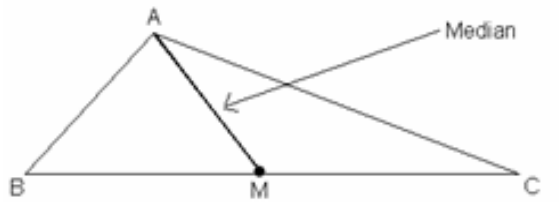
- Properties of Triangles:

(1) Altitude → a **perpendicular** line drawn from a vertex to the opposite side in a triangle



To get equation, find…
- m_{BC}
- $m_{\perp BC}$ ← slope
- point A ← point

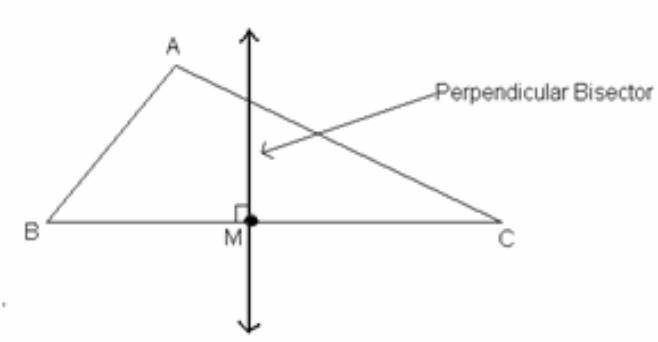
(2) Median → a line drawn from a vertex to the **midpoint** of the opposite side in a triangle



To get equation, find…
- midpoint of BC
- m_{AM} ← slope
- point A or M ← point

To get length, find…
- midpoint of BC
- d_{AM} ← 2 points

(3) Right Bisector (Perpendicular Bisector) → a **perpendicular** line drawn through the **midpoint** of a line segment



To get equation, find…
- m_{BC}
- $m_{\perp BC}$ ← slope
- midpoint of BC ← point

$A = \frac{1}{2}\left|(\text{Sum of Up Products}) - (\text{Sum of Down Products})\right|$

NUMBERS, RELATIONS AND FUNCTIONS 10 **NAME:** _____
REVIEW ACTIVITY **DECEMBER 2011**

Given triangle ABC, with vertices A(4,3), B(2,-7) and C(-6,-1), find:

1. The equation of the altitude drawn from A (general form) $4x-3y-7=0$

2. The equation of the median drawn from C (slope-intercept form) $y=-\frac{1}{9}x-\frac{15}{9}$ $y=-\frac{1}{9}x-\frac{5}{3}$

3. The equation of the perpendicular bisector of side AC (point-slope form) $y-1=-\frac{5}{2}(x+1)$

4. The **x-intercept** of the altitude drawn from B

$x = \frac{-4}{5}$

5. The length of the median drawn from B

$\sqrt{73}$

6. The equation of the perpendicular bisector of the median drawn from A (standard form)

$12x + 14y = 5$

7. The area of triangle ABC

$A = 46$