Bisectors in Triangles

- concurrent → meet @ same point
  - ↳ intersection is point of concurrency

- Concurrency of Perpendicular Bisectors Theorem
  - ↳ Perpendicular bisectors of sides of triangle are concurrent at a point equidistant from vertices
    - ↳ Point of concurrency is circumcenter
      - ↳ Occurs outside (obtuse), inside (acute), or on the hypotenuse (right) of the triangle

@ midpoint

- Finding Circumcenter in Coordinate Plane

↳ Generally, these Δ's are right Δ's, thus we are looking for the midpoint of the hypotenuse

↳ Look for 2 pts w/ nothing in common (no common x or y)

EX → A(0,4) ←
B(0,8)
C(5,8) ←

$\frac{0+5}{2}, \frac{4+8}{2}$

$\left(\frac{5}{2}, 6\right)$

EX → A(3,7) ←
B(5,9) ←
C(5,7)

$\frac{3+5}{2}, \frac{7+9}{2}$

(4,8)

EX → A(3,1) ←
B(-1,2) ←
C(3,2)

$\frac{3+-1}{2}, \frac{1+2}{2}$

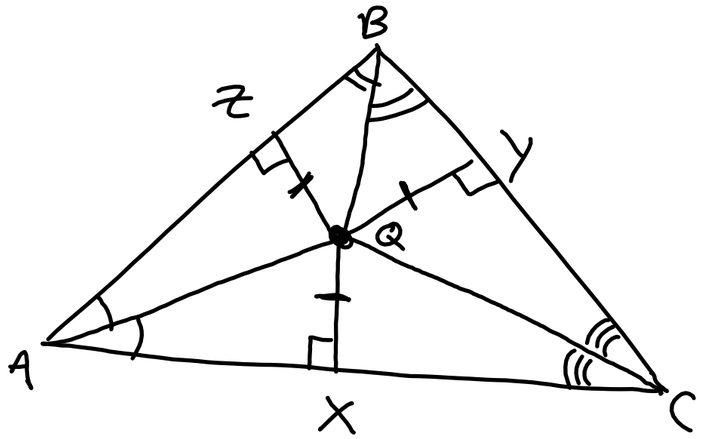
$\left(1, \frac{3}{2}\right)$

- Concurrency of Angle Bisectors

↳ Angle bisectors are concurrent at point equidistant from sides of triangle

↳ Point of concurrency is <u>incenter</u> (circle inscribed in triangle) → <u>ALWAYS INSIDE</u>

- Using the Incenter



<u>EX</u> → $QZ = 5x+2$, $QX = 7x-12$

$5x+2 = 7x-12$

$14 = 2x$

$7 = x$

<u>EX</u> → $QY = -4x+8$, $QZ = -12x-8$

$-4x+8 = -12x-8$

$16 = -8x$

$-2 = x$

HW : p. 305 → 7-13, 15-18, 25-27, 33, 34