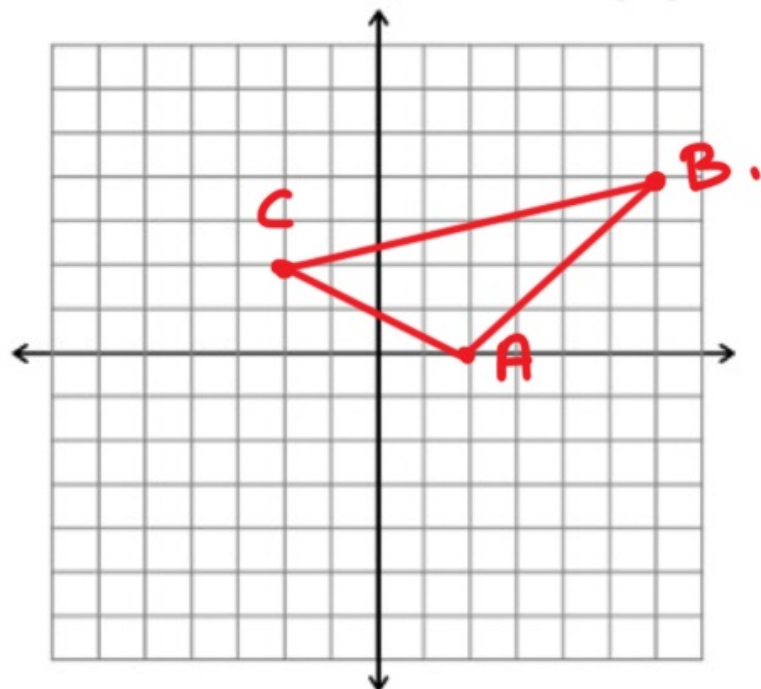Homework

RHS

Geometry RSH

Let $\triangle ABC$ has its coordinates at $A(2, 0), B(6, 4)$, and $C(-2, 2)$.
1. Sketch the triangle.
2. Find equations of perpendicular bisectors of $\overline{AB}, \overline{BC}$, and $\overline{AC}$.
3. Then, find the intersection of the perpendicular bisectors.

$\boxed{\perp \text{ bisector of } \overline{AB}}$

$m_{AB} = \dfrac{4-0}{6-2} = 1$

$m_{\perp} = -1$

$\text{midpt of } \overline{AB} = \left(\dfrac{2+6}{2}, \dfrac{0+4}{2}\right)$

$\qquad\qquad = (4, 2)$

$\boxed{eq.}$

$y - 2 = -1(x - 4)$

⊥ bisector of $\overline{BC}$

$m_{BC} = \dfrac{2-4}{-2-6} = \dfrac{-2}{-8} = \dfrac{1}{4}$

$m_{\perp} = -4$

midpt of $\overline{BC}$

$\left(\dfrac{6+(-2)}{2}, \dfrac{4+2}{2}\right) = (2, 3)$

$y - 3 = -4(x-2)$

⊥ bisector of $\overline{AC}$

$m_{AC} = \dfrac{2-0}{-2-2} = \dfrac{2}{-4} = -\dfrac{1}{2}$

$m_{\perp} = 2$

Midpt of $\overline{AC}$

$\left(\dfrac{2+(-2)}{2}, \dfrac{0+2}{2}\right) = (0, 1)$

$y - 1 = 2(x-0)$

Intersection

① $y - 2 = -1(x - 4)$

② $y - 3 = -4(x - 2)$

③ $y - 1 = 2(x - 0)$

② & ③

$y = -4(x - 2) + 3$

$y = 2x + 1$

$2x + 1 = -4x + 11$

$6x = 10$

$x = \frac{5}{3}$

$y = 2\left(\frac{5}{3}\right) + 1$

$= \frac{13}{3}$

① & ②

$y = -(x - 4) + 2$

$y = -4(x - 2) + 3$

$\left(\frac{5}{3}, \frac{13}{3}\right)$

$-x + 6 = -4x + 11$

$3x = 5 \quad x = \frac{5}{3}, \quad y = -\left(\frac{5}{3} - 4\right) + 2 = \frac{13}{3}$