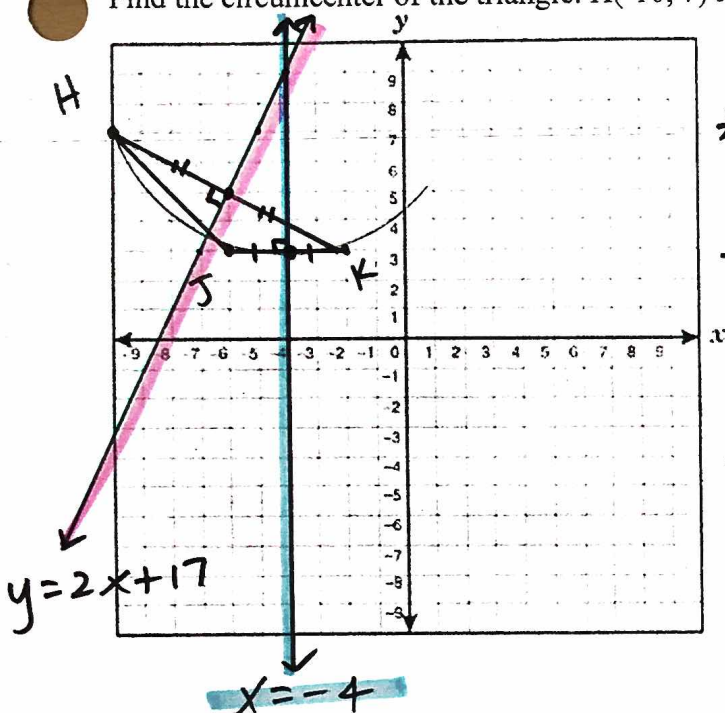


Extra Practice: Circumcenter, Centroids, and Orthocenters in the Coordinate Plane

Find the circumcenter of the triangle. H(-10, 7) J(-6, 3) K(-2, 3)



$$y = 2(-4) + 17$$

$$y = -8 + 17$$

$$y = 9$$

$$(-4, 9)$$

⊥ bisectors of sides
 *choose any vert./horiz side
 to work w/ first (if you have it)
 ⊥ bisect. of JK:

$$\text{mdpt} \left(\frac{-10 + (-2)}{2}, \frac{7 + 3}{2} \right) = (-6, 5)$$

$$\text{slope} = \frac{3 - 7}{-2 - (-10)} = \frac{-4}{8} = -\frac{1}{2}$$

$$\perp \text{ slope} = 2$$

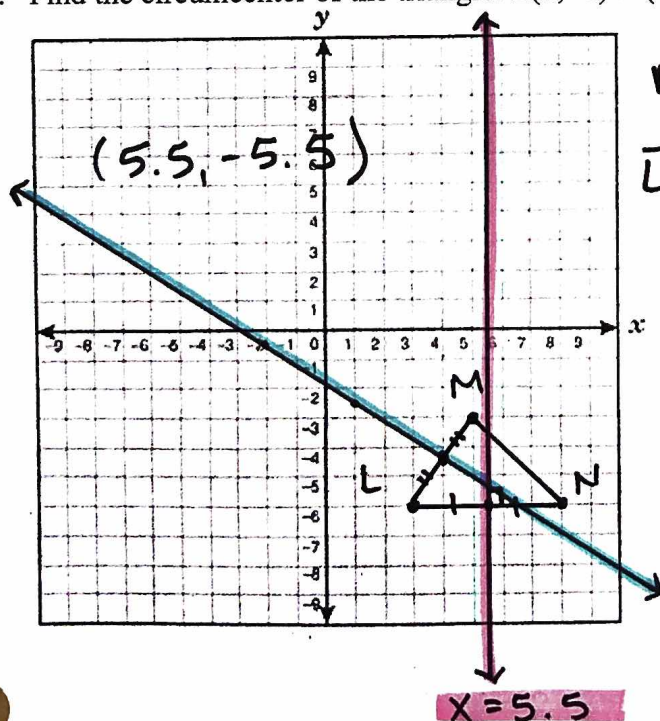
$$y - 5 = 2(x - (-6))$$

$$y - 5 = 2(x + 6)$$

$$y - 5 = 2x + 12$$

$$y = 2x + 17$$

2. Find the circumcenter of the triangle. L(3, -6) M(5, -3) N(8, -6)



$$\text{mdpt } \overline{LN} (5.5, -6)$$

$$\overline{LM}: \text{mdpt} (4, -4.5)$$

$$\text{slope} = \frac{-3 + 6}{5 - 3} = \frac{3}{2}$$

$$\perp \text{ slope} = -\frac{2}{3}$$

$$y + \frac{9}{2} = -\frac{2}{3}(x - 4)$$

$$y + \frac{9}{2} = -\frac{2}{3}x + \frac{8}{3}$$

$$y = -\frac{2}{3}x + \frac{8}{3} - \frac{9}{2}$$

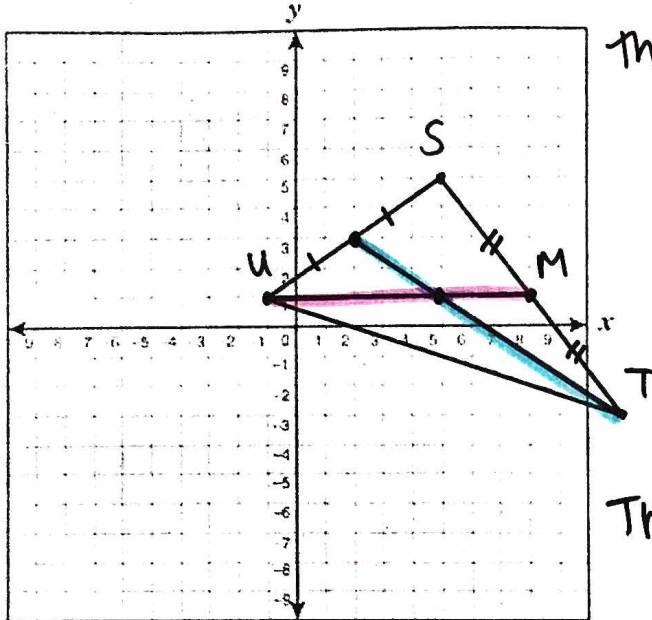
$$y = -\frac{2}{3}x + \frac{16}{6} - \frac{27}{6}$$

$$y = -\frac{2}{3}x - \frac{11}{6}$$

$$y = -\frac{2}{3}\left(\frac{11}{2}\right) - \frac{11}{6}$$

$$y = -\frac{22}{6} - \frac{11}{6} = -\frac{33}{6} = -\frac{11}{2} = -5.5$$

3. Find the centroid of the triangle. S(5, 5) T(11, -3) U(-1, 1)



Thru T: mdpt $\overline{US}$ (2, 3) N

$$\text{slope } \overline{TN} : \frac{3+3}{2-11} = \frac{6}{-9} = -\frac{2}{3}$$

$$\text{eqn. } \overline{TN} : y - 3 = -\frac{2}{3}(x - 2)$$

$$y - 3 = -\frac{2}{3}x + \frac{4}{3}$$

$$y = -\frac{2}{3}x + \frac{13}{3}$$

Thru U: mdpt $\overline{TS}$ (8, 1) M

horiz. line!! $y = 1$

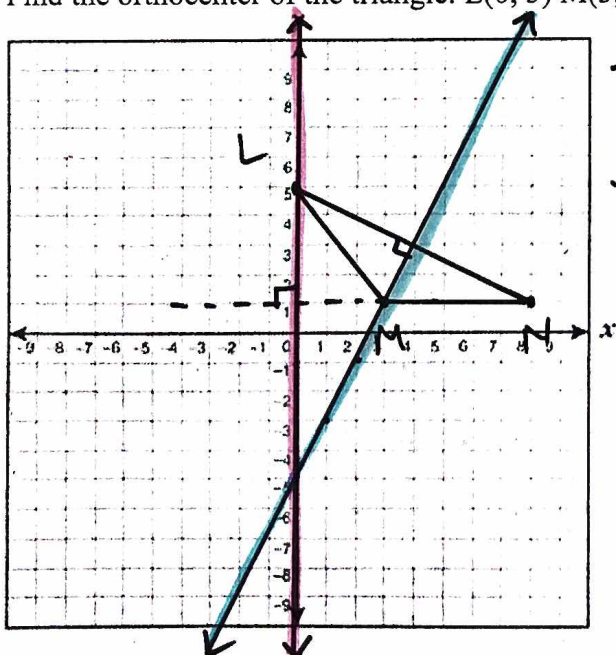
$$1 = -\frac{2}{3}x + \frac{13}{3}$$

$$(5, 1)$$

$$-10/3 = -\frac{2}{3}x$$

$$-10 = -2x \rightarrow x = 5$$

4. Find the orthocenter of the triangle. L(0, 5) M(3, 1) N(8, 1)



thru L: $\perp$ to $\overline{MN}$ $x = 0$

thru M: $\perp$ to $\overline{LN}$

$$\text{slope } \overline{LN} : \frac{1-5}{8-0} = -\frac{4}{8} = -\frac{1}{2}$$

$$\perp \text{ slope} = 2$$

$$y - 1 = 2(x - 3)$$

$$y - 1 = 2x - 6$$

$$y = 2x - 5$$

$$y = 2(0) - 5$$

$$y = -5$$

$$(0, -5)$$