

## Finding Orthocenter Algebraically

For  $\triangle XYZ$ , given  $X(4,8)$   $Y(0,-4)$   $Z(-4,2)$

Find the Orthocenter point, algebraically:

- You need the slope of each side, to determine the slope of each altitude
- Identify which vertex each altitude will pass through and write a point-slope equation  $y - y_1 = m(x - x_1)$
- Solve the equation for  $y$
- Set two equations equal to each other and solve for the  $x$  coordinate
- Substitute into the third equation and solve for the  $y$  coordinate
- Write the orthocenter point as  $O(x, y)$