

How to find the equation of the perpendicular bisector of a line segment

1. Find the coordinates of the **midpoint**
2. Find the slope of the **original line**
3. Find the slope of the perpendicular line by taking the **negative reciprocal** of the answer in step 2
4. Find the equation by taking the midpoint (Step 1) and the negative reciprocal slope from step 3 and plugging into $y - y_1 = m(x - x_1)$

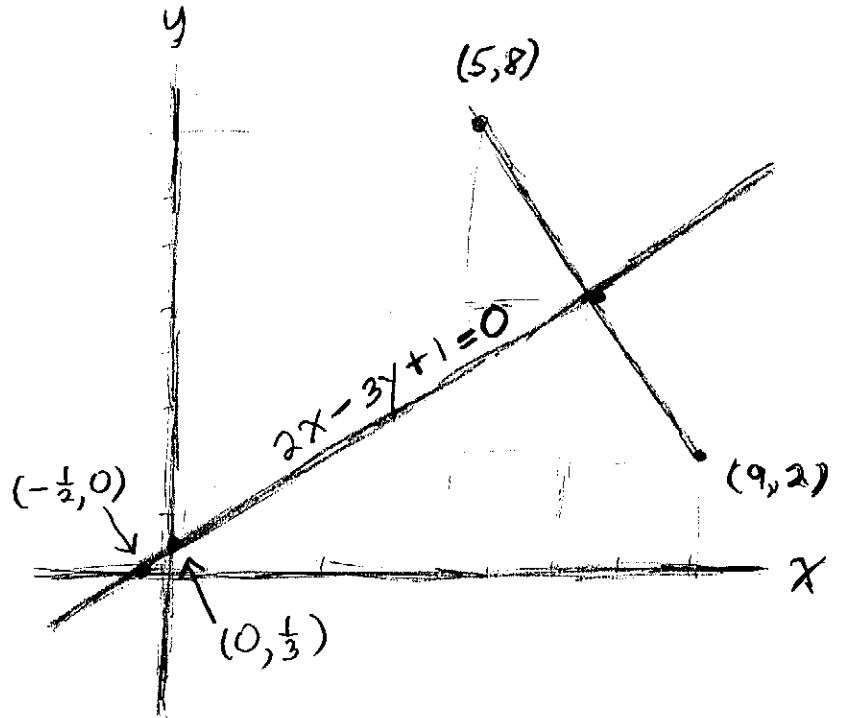
Example: Find equation of the perpendicular bisector of the line segment joining (5,8) and (9,2)

1. **midpoint** = $\left(\frac{5+9}{2}, \frac{8+2}{2}\right) = (7,5)$

2. **slope** = $m = \frac{2-8}{9-5} = \frac{-6}{4} = \frac{-3}{2}$

3. slope of perpendicular = $\frac{2}{3}$

4. $y - 5 = \frac{2}{3}(x - 7)$
 $3y - 15 = 2x - 14$
 $0 = 2x - 3y + 1$



1. Find the equation of the **perpendicular bisector** of the line segment joining each pair of points below:

(a) $(-3, 5)$ and $(5, -7)$ (b) $\left(-2, \frac{7}{2}\right)$ and $\left(-5, -\frac{5}{2}\right)$ (c) $(-9, 9)$ and $(25, -25)$

(d) $(0.02, -3.5)$ and $(1.06, -11.7)$