Point A has coordinates $(\boldsymbol{a}, 6)$ and point B has coordinates $(5, \boldsymbol{b})$.

The line $8x - 6y + 3 = 0$ is the perpendicular bisector of AB.

Find $\boldsymbol{a}$ and $\boldsymbol{b}$.

Write equation in $y = mx + c$ form

$$8x - 6y + 3 = 0$$

$$8x + 3 = 6y$$

$$y = \frac{4}{3}x + \frac{1}{2}$$

Gradient of line $= \frac{4}{3}$

AB is perpendicular to this line

Gradient of AB $= -\frac{3}{4}$

Use coordinates to find gradient of AB in terms of a and b

Gradient of AB $= \frac{b-6}{5-a}$

Equate two expressions for gradient of AB

$$-\frac{3}{4} = \frac{b-6}{5-a}$$

$$-3(5-a) = 4(b-6)$$

$$-15 + 3a = 4b - 24$$

$$3a - 4b = -9$$

Find midpoint of AB

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

This point must lie on the perpendicular bisector $8x - 6y + 3 = 0$

$$8\left(\frac{a+5}{2}\right) - 6\left(\frac{6+b}{2}\right) + 3 = 0$$

$$4(a+5) - 3(6+b) + 3 = 0$$

$$4a + 20 - 18 - 3b + 3 = 0$$

$$4a - 3b = -5$$

We now have 2 simultaneous equations in a and b to solve

$$3a - 4b = -9$$

$$4a - 3b = -5$$

$$9a - 12b = -27$$

$$16a - 12b = -20$$

$$7a = 7$$

$$a = 1$$

$$b = 3$$