

$A(1,2)$   
 $B(3,1)$   
 $P(5,7)$   
 +:  $d(P, AB)$   
 2:  $d(P, AB)$

$d(P, A) = d(P, B)$

$A(1,2) \quad B(3,1)$   
 $\frac{x-1}{2-1} = \frac{y-2}{1-2} \Rightarrow \frac{x-1}{2-1} = \frac{y-2}{-1}$   
 $x-1 = -y+2 \Rightarrow x+y-3=0$   
 $7x-7 = -y+2 \Rightarrow 7x+y-9=0$

$A(1,2) \quad B(3,1)$   
 $\frac{x-1}{3-1} = \frac{y-2}{1-2} \Rightarrow \frac{x-1}{2} = \frac{y-2}{-1}$   
 $x-1 = -2y+4 \Rightarrow x+2y-5=0$   
 $x-y+1=0$

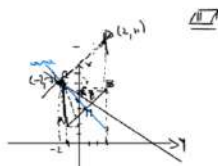
$d(P, AB) = \frac{|ax+by+c|}{\sqrt{a^2+b^2}}$   
 $= \frac{|7x-y-9|}{\sqrt{49+1}} = \frac{|7x-y-9|}{\sqrt{50}}$   
 $a=7, b=-1, c=-9$

$d(P, A) = \frac{|x-1+y-2|}{\sqrt{2}} = \frac{|x+y-3|}{\sqrt{2}}$   
 $d(P, B) = \frac{|x-3+y-1|}{\sqrt{2}} = \frac{|x+y-4|}{\sqrt{2}}$

$\frac{|7x-y-9|}{\sqrt{50}} = \frac{|x+y-3|}{\sqrt{2}}$   
 $|7x-y-9| = 5|x+y-3|$   
 $|7x-y-9| = 5|x+y-3|$   
 $7x-y-9 = 5x+5y-15$   
 $2x-6y+6=0$   
 $x-3y+3=0$

$7x-y-9 = -5x-5y+15$   
 $12x+4y-24=0$   
 $3x+y-6=0$   
 $3x-3y+3=0$   
 $4y-9=0$   
 $y = \frac{9}{4}$   
 $x = 6 - \frac{9}{4} = \frac{15}{4}$

$2y = -x + 5$   
 $y = -\frac{1}{2}x + \frac{5}{2}$



$$3y = 2x + 7$$

$$y = -\frac{2}{3}x + \frac{7}{3}$$

$$\begin{array}{r} 2 \\ 0 \\ 1 \end{array} \left| \begin{array}{r} 7 \\ 3 \\ 3 \end{array} \right.$$

$$M \left( \frac{x_A + x_B}{2}, \frac{y_A + y_B}{2} \right) = \left( \frac{-1 + 3}{2}, \frac{3 + 6}{2} \right) = (1, 4.5)$$

$$m_{AB} = \frac{\Delta y}{\Delta x} = \frac{y_B - y_A}{x_B - x_A} = \frac{6 - 3}{3 - (-1)} = \frac{3}{4} = \frac{3}{4}$$

$$m_{\perp AB} = -\frac{1}{m_{AB}} = -\frac{4}{3}$$

$$y - y_M = m_{\perp AB} (x - x_M)$$

$$y - 4.5 = -\frac{4}{3} (x - 1)$$

$$y = -\frac{4}{3}x + \frac{4}{3} + 4.5$$

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

$$-x + 5 = -\frac{2}{3}x + \frac{17}{3}$$

$$-3x + 15 = -2x + 17$$

$$-x = 2 \Rightarrow x = -2$$

$$y = -(-2) + 5 = 7$$

$$C(-2, 7)$$

$$\overline{AC} \parallel \overline{DB} \quad A(-1, 2) \quad C(-2, 7)$$

$$m_{AC} = \frac{y_C - y_A}{x_C - x_A} = \frac{7 - 2}{-2 - (-1)} = \frac{5}{-1} = -5 \Rightarrow m_{DB} = -5$$

$$B(3, 1) \quad y - 1 = -5(x - 3)$$

$$y - 1 = -5x + 15$$

$$y = -5x + 16$$

$$m_{AB} = 1 \quad m_{CD} = 1$$

$$C(-2, 7) \quad y - 7 = 1(x - (-2))$$

$$y - 7 = x + 2$$

$$y = x + 9$$

$$-5x + 16 = x + 9$$

$$-6x = -7 \Rightarrow x = \frac{7}{6}$$

$$y = \frac{7}{6} + 9 = \frac{7}{6} + \frac{54}{6} = \frac{61}{6}$$

$$D\left(\frac{7}{6}, \frac{61}{6}\right)$$