

C1 Jan 2009

① A(2,-1) B(-7,1) C(5,4)

Gradient BC = $\frac{4-1}{5-(-7)} = \frac{3}{12} = \frac{1}{4}$ Line BC passes through C(5,4)

Equation of line BC is $y-4 = \frac{1}{4}(x-5)$

(x4) $4y-16 = x-5$

$4y-x-11 = 0$

(x-1) $x-4y+11 = 0$

QED.

AD is perpendicular to BC $(m_1 \times m_2 = -1)$

Gradient AD = -4

Equation of line AD is $y-(-1) = -4(x-2)$

$y+1 = -4x+8$

$4x+y-7 = 0$

(b) D is point of intersection of BC and AD

BC $x-4y+11 = 0$

AD $4x+y-7 = 0$

x4

+ $x-4y+11 = 0$

$16x+4y-28 = 0$

$17x-17 = 0$

$x = \frac{17}{17} = 1$

Sub $x=1$ into BC $1-4y+11 = 0$

$12 = 4y$

$\frac{12}{4} = y$

$x=1 \quad y=3$

\Rightarrow D is (1,3)

QED.

c) C(5,4) D(1,3)

length CD = $\sqrt{(5-1)^2 + (4-3)^2}$

= $\sqrt{16+1}$

= $\sqrt{17}$

D(1,3) is midpoint of AE A(2,-1) E(x,y)

$\frac{2+x}{2} = 1$

$\frac{-1+y}{2} = 3$

$2+x = 2$

$-1+y = 6$

$x = 0$

$y = 7$

E is (0,7)