2010 Question 3 – Project Maths Higher Sample Paper 2 Solution

(a)   Equation of $AB = y - y_1 = m(x - x_1)$

Slope of $AB = \dfrac{y_2 - y_1}{x_2 - x_1} = \dfrac{-6 - 2}{6 - 2} = \dfrac{-8}{2} = -2$

$\therefore$ Equation of AB is

$y - 2 = -2(x - 2) \quad \Rightarrow \quad y - 2 = -2x + 4$

$\Rightarrow \quad 2x + y - 6 = 0$

(5 marks)

(b)   The line AB cuts the y axis at $x = 0$

$2(0) + y - 6 = 0 \quad \Rightarrow \quad y = 6 \quad D(0,6)$

(5 marks)

(iii)   Distance from $(-2, -3)$ to AB is found using

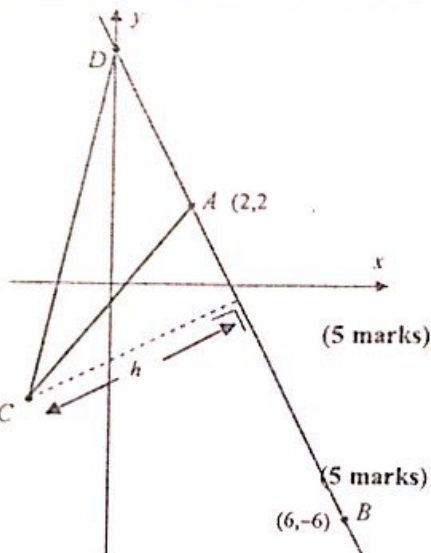$\left| \dfrac{ax_1 + by_1 + c}{\sqrt{a^2 + b^2}} \right|$

$\left| \dfrac{2(-2) + 1(-3) - 6}{\sqrt{2^2 + 1^2}} \right| = \left| \dfrac{-13}{\sqrt{5}} \right| = \dfrac{13}{\sqrt{5}}$

(5 marks)

(iv)   "Hence" means use previous information, i.e. $|h|$

The area of $\triangle ADC$. We can use $\dfrac{1}{2}$ base $\times$ height

$|AD| = \sqrt{(0 - 2)^2 + (6 - 2)^2} = \sqrt{20}$

$\therefore$ Area of $\triangle ADC = \dfrac{1}{2}\sqrt{20} \times \dfrac{13}{\sqrt{5}} = 13$ square units

(10 marks)

Comment: *Very similar to old course. Note no proofs.*