

## C1: Geometreg Cyfesuri a Cartesaid

Gaeaf 2005

①  $A = (2, 3) \quad B = (5, 9)$

(a) Graddiant  $AB = \frac{y_2 - y_1}{x_2 - x_1}$

$$= \frac{9 - 3}{5 - 2}$$
$$= \frac{6}{3}$$
$$= 2$$

Felly graddiant llinell sy'n berpendicular i  $AB = -\frac{1}{2}$ .

Yn defnyddio  $y - y_1 = m(x - x_1)$  i ddarganfod hafaliad llinell  $BC$ :

$$\begin{aligned} y - 9 &= -\frac{1}{2}(x - 5) \\ 2y - 18 &= -1(x - 5) \\ 2y - 18 &= -x + 5 \\ x + 2y - 23 &= 0. \quad \checkmark \end{aligned}$$

(b) Yn amnewid  $y = 0$  i mewn i'r hafaliad:

$$x + 2(0) - 23 = 0$$

$$x = 23$$

Felly  $C = (23, 0)$ .

(c)  $D = (24, 1)$ .

Graddiant  $CD = \frac{y_2 - y_1}{x_2 - x_1}$

$$= \frac{1 - 0}{24 - 23}$$
$$= \frac{1}{1}$$

Beth yw hafaliad llinell trwy A sŷn barael ir llinell CD (graddiant 1) ?

$$\begin{aligned}y - y_1 &= m(x - x_1) \\y - 3 &= 1(x - 2) \\y - 3 &= x - 2 \\y &= x + 1\end{aligned}$$

Ble mae'r llinell yma'n croestorri'r llinell  $x + 2y - 23 = 0$ ?

Yn amnewid am y i mewn ir hafaliad:

$$x + 2(x+1) - 23 = 0$$

$$x + 2x + 2 - 23 = 0$$

$$3x - 21 = 0$$

$$3x = 21$$

$$\underline{x = 7} \rightarrow \text{felly } y = x + 1 \\y = 7 + 1 \\y = 8$$

Felly  $E = (7, 8)$ . ✓

$$(ch) C = (23, 0) \quad E = (7, 8)$$

$$\begin{aligned}\text{Hyd } CE &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\&= \sqrt{(7 - 23)^2 + (8 - 0)^2} \\&= \sqrt{(-16)^2 + 8^2} \\&= \sqrt{256 + 64} \\&= \sqrt{320} \\&= \sqrt{16 \times 20} \\&= 4\sqrt{20} \\&= 4\sqrt{4 \times 5} \\&= 4 \times 2 \times \sqrt{5} \\&= 8\sqrt{5} \text{ uned.}\end{aligned}$$

Gaeaf 2006

①  $A = (-2, -3)$   $B = (6, 1)$   $C = (K, 3)$   $AB \perp BC$

(a) Graddiant  $AB = \frac{y_2 - y_1}{x_2 - x_1}$

$$= \frac{1 - -3}{6 - -2}$$
$$= \frac{4}{8}$$
$$= \frac{1}{2}.$$

(b) Graddiant  $BC$   $yw - 2$

Felly  $\frac{y_2 - y_1}{x_2 - x_1} = -2$

$$\frac{3 - 1}{K - 6} = -2$$
$$2 = -2(K - 6)$$
$$2 = -2K + 12$$
$$-10 = -2K$$
$$\underline{K = 5} \quad \checkmark$$

(c) Graddiant L  $yw - 2$ .

$$y - y_1 = m(x - x_1)$$

$$y - -3 = -2(x - -2)$$

$$y + 3 = -2(x + 2)$$

$$y + 3 = -2x - 4$$

$$\underline{y = -2x - 7}$$

(ch) Yn amnewid  $x = 0$  i meun ir hafaliad:

$$y = -2(0) - 7$$

$$y = -7.$$

Felly  $D = (0, -7)$ .

$$C=(5,3) D=(0,-7)$$

$$\begin{aligned}
 \text{Hyd } CD &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\
 &= \sqrt{(0 - 5)^2 + (-7 - 3)^2} \\
 &= \sqrt{(-5)^2 + (-10)^2} \\
 &= \sqrt{25 + 100} \\
 &= \sqrt{125} \\
 &= \sqrt{5 \times 25} \\
 &= 5\sqrt{5} \text{ uned.}
 \end{aligned}$$

Haf 2006

$$\textcircled{1} \quad A = (3, 2) \quad B = (-4, 3) \quad C = (5, 6) \quad D = (4, -1)$$

(a) Graddiant AC

$$\begin{aligned}
 &= \frac{y_2 - y_1}{x_2 - x_1} \\
 &= \frac{6 - 2}{5 - 3} \\
 &= \frac{4}{2} \\
 &= 2
 \end{aligned}$$

Graddiant BD

$$\begin{aligned}
 &= \frac{y_2 - y_1}{x_2 - x_1} \\
 &= \frac{-1 - 3}{4 - -4} \\
 &= \frac{-4}{8} \\
 &= -\frac{1}{2}
 \end{aligned}$$

Gan fod 2 yn negatif cilydd  $-\frac{1}{2}$  mae AC a BD yn berpendicwlar.

$$\begin{aligned}
 \text{(b) Itafaliad AC: } \quad y - y_1 &= m(x - x_1) \\
 y - 2 &= 2(x - 3) \\
 y - 2 &= 2x - 6 \\
 y &= 2x - 4 \\
 0 &= 2x - y - 4 \\
 2x - y - 4 &= 0 \quad \checkmark
 \end{aligned}$$

Hafaliad BD:  $y - y_1 = m(x - x_1)$   
 $y - 3 = -\frac{1}{2}(x - -4)$   
 $y - 3 = -\frac{1}{2}x + 2$   
 $y = -\frac{1}{2}x + 1$

(c) BD:  $y = -\frac{1}{2}x + 1$       AC:  $y = 2x - 4$

$\downarrow$                            $\downarrow$   
 $-\frac{1}{2}x + 1 = 2x - 4$   
 $5 = 2\frac{1}{2}x$   
 $x = 2 \rightarrow$  felly  $y = 2x - 4$   
 $y = 2 \times 2 - 4$   
 $y = 0$

Felly E = (2, 0)

(ch) A = (3, 2)      E = (2, 0)

Hyd AE =  $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$   
 $= \sqrt{(2 - 3)^2 + (0 - 2)^2}$   
 $= \sqrt{(-1)^2 + (-2)^2}$   
 $= \sqrt{1 + 4}$   
 $= \sqrt{5}$  uned

Gaeaf 2007

① A = (-5, 0) B = (0, 5) C = (3, 4) D = (4, -3)

(a) Graddiant AC

$$= \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{4 - 0}{3 - -5}$$

$$= \frac{4}{8}$$

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

Graddiant BD

$$= \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{-3 - 5}{4 - 0}$$

$$= \frac{-8}{4}$$

$$= -2$$

Gran fod  $\frac{1}{2}$  yn negatif cilydd -2 mae AC yn  
berpendicwlar i BD.

(b) Graddiant AD

$$\begin{aligned} &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{-3 - 0}{4 - -5} \\ &= \frac{-3}{9} \\ &= -\frac{1}{3} \end{aligned}$$

Graddiant BC

$$\begin{aligned} &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{4 - 5}{3 - 0} \\ &= \frac{-1}{3} \\ &= -\frac{1}{3} \end{aligned}$$

Felly mae AD yn barafol i BC gan eu bod efo'r un graddiant  $(-\frac{1}{3})$ .

(c) Graddiant AC =  $\frac{1}{2}$

Hafaliad AC:  $y - y_1 = m(x - x_1)$   
 $y - 0 = \frac{1}{2}(x - -5)$   
 $y = \frac{1}{2}(x + 5)$   
 $2y = x + 5$   
 $0 = x - 2y + 5$   
 $x - 2y + 5 = 0 \quad \checkmark \quad -\textcircled{1}$

Graddiant BD = -2

Hafaliad BD:  $y - y_1 = m(x - x_1)$   
 $y - 5 = -2(x - 0)$   
 $y - 5 = -2x$   
 $y = -2x + 5 \quad -\textcircled{2}$

(ch) Yn amnewid am y o  $\textcircled{2}$ ;  $\textcircled{1}$ :

$$\begin{aligned} x - 2(-2x + 5) + 5 &= 0 \\ x + 4x - 10 + 5 &= 0 \\ 5x &= 5 \end{aligned}$$

$$x = 1$$

Felly, yn amnewid yn ôl i ②:

$$y = -2x + 5$$

$$y = -2(1) + 5$$

$$y = -2 + 5$$

$$\underline{y = 3}$$

Felly  $E = (1, 3)$  ✓

(ii)  $A = (-5, 0)$   $E = (1, 3)$

$$\text{Hyd } AE = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$
$$= \sqrt{(1 - -5)^2 + (3 - 0)^2}$$

$$\begin{aligned} &= \sqrt{6^2 + 3^2} \\ &= \sqrt{36 + 9} \\ &= \sqrt{45} \\ &= \sqrt{9 \times 5} \\ &= 3\sqrt{5} \end{aligned}$$

Haf 2007

①  $A = (-1, 3)$   $B = (1, 7)$   $C = (2, -1)$   $D = (5, k)$ .  $AB \parallel CD$

(a) Graddiant  $AB = \frac{y_2 - y_1}{x_2 - x_1}$

$$= \frac{7 - 3}{1 - -1}$$
$$= \frac{4}{2}$$
$$= 2.$$

(b) Graddiant  $CD = 2$ . Felly  $2 = \frac{y_2 - y_1}{x_2 - x_1}$

$$2 = \frac{k - -1}{5 - 2}$$
$$2 = \frac{k + 1}{3}$$
$$6 = k + 1$$
$$\underline{k = 5} \quad \checkmark$$

(c) Graddiant CD = 2

Graddiant L =  $-\frac{1}{2}$ . (Negatif y cilydd.)

Hafaliad L:  $y - y_1 = m(x - x_1)$

$$y - 3 = -\frac{1}{2}(x - -1)$$

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

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

$$2y - 6 = -x - 1$$

$$2y - 6 + 1 + x = 0$$

$$2y - 5 + x = 0$$

$$x + 2y - 5 = 0 \quad \checkmark \quad \rightarrow \textcircled{1}$$

(ch) Hafaliad CD: (Graddiant = 2)

$$y - y_1 = m(x - x_1)$$

$$y - -1 = 2(x - 2)$$

$$y + 1 = 2x - 4$$

$$y = 2x - 5 \quad \rightarrow \textcircled{2}$$

Yn amnewid am y o \textcircled{2} i \textcircled{1}:

$$x + 2(2x - 5) - 5 = 0$$

$$x + 4x - 10 - 5 = 0$$

$$5x - 15 = 0$$

$$5x = 15$$

$x = 3$   $\rightarrow$  Felly, yn ôl yn \textcircled{2}:

$$y = 2x - 5$$

$$y = 2(3) - 5$$

$$y = 6 - 5$$

$$\underline{y = 1}$$

Felly E = (3, 1).

Gaeaf 2008

$$\textcircled{1} \quad A = (-2, 3) \quad B = (10, -1) \quad C = (3, 8)$$

(a) Graddiant  $AB = \frac{y_2 - y_1}{x_2 - x_1}$

$$= \frac{-1 - 3}{10 - -2}$$

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

$$= -\frac{1}{3}$$

(b) Itafaliad  $AB: y - y_1 = m(x - x_1)$

$$y - 3 = -\frac{1}{3}(x - -2)$$

$$3y - 9 = -1(x + 2)$$

$$3y - 9 = -x - 2$$

$$3y + x - 9 + 2 = 0$$

$$x + 3y - 7 = 0. \quad \checkmark \quad -\textcircled{1}$$

Graddiant  $CD = 3$

(negatif cilydd  $-\frac{1}{3}$ )

Itafaliad  $CD: y - y_1 = m(x - x_1)$

$$y - 8 = 3(x - 3)$$

$$y - 8 = 3x - 9$$

$$y = 3x - 1 \quad -\textcircled{2}$$

(c) Yn amnewid am  $y = 0$   $\textcircled{2}; \textcircled{1}$ :

$$x + 3(3x - 1) - 7 = 0$$

$$x + 9x - 3 - 7 = 0$$

$$10x - 10 = 0$$

$$10x = 10$$

$$\underline{x = 1}$$

Felly, yn ôl yn  $\textcircled{2}$ :

$$y = 3(1) - 1$$

$$y = 3 - 1$$

$$\underline{y = 2}$$

Felly  $D = (1, 2)$   $\checkmark$

(ch)  $E = \text{canolbwyt } AB$

$$= \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$= \left( \frac{-2 + 10}{2}, \frac{3 + -1}{2} \right)$$

$$= \left( \frac{8}{2}, \frac{2}{2} \right)$$

$$= (4, 1).$$

$$D = (1, 2) \quad E = (4, 1)$$

$$\begin{aligned} \text{Hyd } ED &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(4 - 1)^2 + (1 - 2)^2} \\ &= \sqrt{3^2 + (-1)^2} \\ &= \sqrt{9 + 1} \\ &= \sqrt{10} \text{ uned.} \end{aligned}$$

Haf 2008

$$A = (-7, 4) \quad B = (3, -1) \quad C = (6, 1) \quad D = (k, -15)$$

① (a) Graddiant  $AB = \frac{y_2 - y_1}{x_2 - x_1}$

$$\begin{aligned} &= \frac{-1 - 4}{3 - -7} \\ &= \frac{-5}{10} \\ &= -\frac{1}{2} \end{aligned}$$

(b) Hafaliad  $AB: y - y_1 = m(x - x_1)$

$$y - 4 = -\frac{1}{2}(x - -7)$$

$$y - 4 = -\frac{1}{2}(x + 7)$$

$$2y - 8 = -x - 7$$

$$2y + x - 1 = 0$$

$$(c) A = (-7, 4) \quad B = (3, -1)$$

$$\begin{aligned} \text{Hyd } AB &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(3 - -7)^2 + (-1 - 4)^2} \\ &= \sqrt{10^2 + (-5)^2} \\ &= \sqrt{100 + 25} \\ &= \sqrt{125} \\ &= \sqrt{25 \times 5} \\ &= 5\sqrt{5} \text{ uned} \end{aligned}$$

$$\begin{aligned} (ch) E &= \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \\ &= \left( \frac{-7 + 3}{2}, \frac{4 + -1}{2} \right) \\ &= \left( -\frac{4}{2}, \frac{3}{2} \right) \\ E &= (-2, 1.5) \end{aligned}$$

$$(d) \text{ Graddiant } AB = -\frac{1}{2}$$

$$\text{Graddiant } CD = 2 \quad (\text{negatif y cilydd})$$

$$\text{Felly } 2 = \frac{y_2 - y_1}{x_2 - x_1}$$

$$C = (6, 1) \quad D = (k, -15)$$

$$2 = \frac{-15 - 1}{k - 6}$$

$$2 = \frac{-16}{k - 6}$$

$$2(k - 6) = -16$$

$$2k - 12 = -16$$

$$2k = -4$$

$$\underline{k = -2}$$

Graef 2009

①  $A = (2, -1)$ ,  $B = (-7, 1)$ ,  $C = (5, 4)$

$$\begin{aligned}\text{(a) Graddiant } BC &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{4 - 1}{5 - -7} \\ &= \frac{3}{12} \\ &= \frac{1}{4}\end{aligned}$$

$$\begin{aligned}\text{Hafaliad } BC: \quad y - y_1 &= m(x - x_1) \\ y - 1 &= \frac{1}{4}(x - -7) \\ y - 1 &= \frac{1}{4}(x + 7) \\ 4y - 4 &= x + 7 \\ 0 &= x - 4y + 11 \\ x - 4y + 11 &= 0 \quad \checkmark \quad \text{---(1)}\end{aligned}$$

Graddiant  $AD = -4$  (negatif y cilydd)

$$\begin{aligned}\text{Hafaliad } AD: \quad y - y_1 &= m(x - x_1) \\ y - -1 &= -4(x - 2) \\ y + 1 &= -4x + 8 \\ y &= -4x + 7. \quad \text{---(2)}\end{aligned}$$

(b) Yn amnewid am y o ② i ① :

$$x - 4(-4x + 7) + 11 = 0$$

$$x + 16x - 28 + 11 = 0$$

$$17x - 17 = 0$$

$$17x = 17$$

$x = 1$   $\rightarrow$  Yn amnewid yn ôl i ②:

$$y = -4(1) + 7$$

$$y = -4 + 7$$

$$\underline{y = 3}$$

Felly  $D = (1, 3)$   $\checkmark$

$$(c) C = (5, 4) \quad D = (1, 3)$$

$$\begin{aligned} \text{Hyd } CD &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(1 - 5)^2 + (3 - 4)^2} \\ &= \sqrt{(-4)^2 + (-1)^2} \\ &= \sqrt{16 + 1} \\ &= \sqrt{17} \text{ uned} \end{aligned}$$

$$(ch) \quad A = (2, -1) \quad D = (1, 3) \quad E = (?)$$

$\nwarrow$  canolbwyt  $\nearrow$

$$\text{Canolbwyt} = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$(1, 3) = \left( \frac{2 + x_2}{2}, \frac{-1 + y_2}{2} \right)$$

Cyfesuryn-x:

$$1 = \frac{2 + x_2}{2}$$

$$2 = 2 + x_2$$

$$x_2 = 0$$

Cyfesuryn-y:

$$3 = \frac{-1 + y_2}{2}$$

$$6 = -1 + y_2$$

$$y_2 = 7$$

$$\text{Felly } E = (0, 7)$$

Haf 2009

$$(1) \quad A = (-1, 5) \quad B = (7, 11)$$

$$\begin{aligned} \text{(a) Graddiant } AB &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{11 - 5}{7 - -1} \\ &= \frac{6}{8} \\ &= \frac{3}{4} \end{aligned}$$

$$(b) C = \left( \frac{x_1+x_2}{2}, \frac{y_1+y_2}{2} \right)$$

$$C = \left( \frac{-1+7}{2}, \frac{5+11}{2} \right)$$

$$C = \left( \frac{6}{2}, \frac{16}{2} \right)$$

$$C = (3, 8)$$

(c) Graddiant L =  $-\frac{4}{3}$  (negatif cilydd graddiant AB)

Hafaliad L:  $y - y_1 = m(x - x_1)$

$$y - 8 = -\frac{4}{3}(x - 3)$$

$$3y - 24 = -4(x - 3)$$

$$3y - 24 = -4x + 12$$

$$4x + 3y - 24 - 12 = 0$$

$$4x + 3y - 36 = 0. \quad \checkmark$$

(ch) Amnewid y = 0 i mewn i L:

$$4x + 3(0) - 36 = 0$$

$$4x = 36$$

$$x = 9 \quad \text{Felly } D = (9, 0)$$

(ii)  $C = (3, 8) \quad D = (9, 0)$

$$\text{Hyd } CD = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$= \sqrt{(9 - 3)^2 + (0 - 8)^2}$$

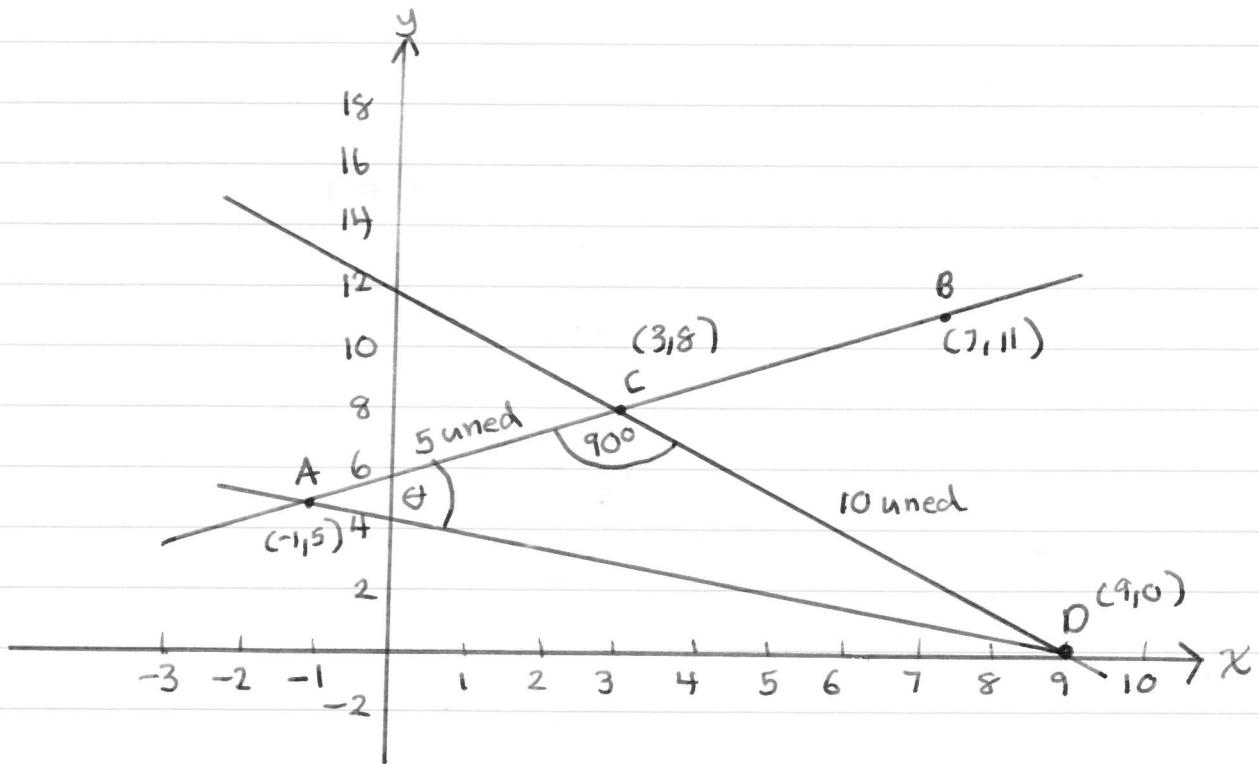
$$= \sqrt{6^2 + (-8)^2}$$

$$= \sqrt{36 + 64}$$

$$= \sqrt{100}$$

$$= 10 \text{ uned}$$

(iii) Rydym angen braslun:



$$\begin{aligned}
 \text{Hyd } AC &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\
 &= \sqrt{(3 - -1)^2 + (8 - 5)^2} \\
 &= \sqrt{4^2 + 3^2} \\
 &= \sqrt{16 + 9} \\
 &= \sqrt{25} \\
 &= 5 \text{ uned}
 \end{aligned}$$

$$\tan \hat{C}AD = \frac{\text{cyferbyn}}{\text{agos}}$$

$$\tan \hat{C}AP = \frac{10}{5}$$

$$\tan \hat{C}AD = 2$$

(Gaeaf 2010)

①  $A = (-1, 10) \quad B = (-5, 12) \quad C = (3, 8)$

(a) Graddiant  $BC = \frac{y_2 - y_1}{x_2 - x_1}$

$$= \frac{8 - 12}{3 - -5}$$
$$= -\frac{4}{8}$$
$$= -\frac{1}{2}$$

(b) (i) Graddiant  $L_1 = -\frac{1}{2}$  (parallel i  $BC$ ).

Itafaliad  $L_1$ :  $y - y_1 = m(x - x_1)$

$$y - 10 = -\frac{1}{2}(x - -11)$$
$$2y - 20 = -(x + 11)$$
$$2y - 20 = -x - 11$$
$$x + 2y - 20 + 11 = 0$$
$$x + 2y - 9 = 0 \quad \checkmark \quad -①$$

(ii) Graddiant  $L_2 = 2$  (negatif cilydd  $-\frac{1}{2}$ )

Itafaliad  $L_2$ :  $y - y_1 = m(x - x_1)$

$$y - 8 = 2(x - 3)$$
$$y - 8 = 2x - 6$$
$$y = 2x + 2 \quad -②$$

(c) (i) Yn amnewid am  $y$  o ② i ①:

$$x + 2(2x + 2) - 9 = 0$$

$$x + 4x + 4 - 9 = 0$$

$$5x - 5 = 0$$

$$5x = 5$$

$$\underline{x = 1}$$

Yn amnewid yn ôl i: ②:  $y = 2(1) + 2$

$$\begin{aligned}y &= 2 + 2 \\y &= 4\end{aligned}$$

Felly  $D = (1, 4)$ . ✓

(ii)  $B = (-5, 12)$   $D = (1, 4)$

$$\begin{aligned}\text{Hyd } BD &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\&= \sqrt{(1 - -5)^2 + (4 - 12)^2} \\&= \sqrt{6^2 + (-8)^2} \\&= \sqrt{36 + 64} \\&= \sqrt{100} \\&= 10 \text{ uned}\end{aligned}$$

$$\begin{aligned}\text{(iii) Canolbwynt } BD &= \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \\&= \left( \frac{-5 + 1}{2}, \frac{12 + 4}{2} \right) \\&= \left( -\frac{4}{2}, \frac{16}{2} \right) \\&= (-2, 8)\end{aligned}$$

Itaf 2010

①  $A = (-6, 4)$   $B = (9, -1)$   $C = (3, 16)$   $D = (-7, 11)$

$$\begin{aligned}\text{(a) (i) Graddiant } AC &= \frac{y_2 - y_1}{x_2 - x_1} \\&= \frac{16 - 4}{3 - -6} \\&= \frac{12}{9} \\&= \frac{4}{3}\end{aligned}$$

(ii) Hafaliad AC:  $y - y_1 = m(x - x_1)$

$$y - 4 = \frac{4}{3}(x - -6)$$

$$3y - 12 = 4(x + 6)$$

$$3y - 12 = 4x + 24$$

$$0 = 4x - 3y + 24 + 12$$

$$0 = 4x - 3y + 36$$

$$4x - 3y + 36 = 0 \quad \checkmark \quad \text{--- (1)}$$

(iii) Graddiant BD =  $\frac{y_2 - y_1}{x_2 - x_1}$

$$= \frac{11 - -1}{-7 - 9}$$

$$= \frac{12}{-16}$$

$$= -\frac{3}{4}.$$

Gan fod  $-\frac{3}{4}$  yn negatif ailydd  $\frac{4}{3}$  mae  
BD yn berpendicwlar i AC.

(iv) Hafaliad BD:  $y - y_1 = m(x - x_1)$

$$y - -1 = -\frac{3}{4}(x - 9)$$

$$y + 1 = -\frac{3}{4}(x - 9)$$

$$4y + 4 = -3(x - 9)$$

$$4y + 4 = -3x + 27$$

$$4y = -3x + 27 - 4$$

$$4y = -3x + 23$$

$$y = -\frac{3}{4}x + \frac{23}{4} \quad \text{--- (2)}$$

(b) (i) Yn amnewid am y o (2) i (1):

$$4x - 3(-\frac{3}{4}x + \frac{23}{4}) + 36 = 0$$

$$4x + \frac{9}{4}x - \frac{69}{4} + 36 = 0$$

$$\frac{25}{4}x = \frac{69}{4} - 36$$

$$25x = 69 - 144$$

$$25x = -75$$

$x = -3$   $\rightarrow$  Yn amnewid yn ddi i ②:

$$y = -\frac{3}{4}(-3) + \frac{23}{4}$$

$$y = \frac{9}{4} + \frac{23}{4}$$

$$y = \frac{32}{4}$$

$$\underline{y = 8}$$

Felly  $E = (-3, 8)$  ✓

(ii)  $B = (9, -1)$   $E = (-3, 8)$

$$\begin{aligned} \text{Hyd } BE &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(-3 - 9)^2 + (8 - -1)^2} \\ &= \sqrt{(-12)^2 + (9)^2} \\ &= \sqrt{144 + 81} \\ &= \sqrt{225} \\ &= 15 \text{ uned} \end{aligned}$$

Graaf 2011

①  $A = (-1, 2)$   $B = (8, 5)$

$$\begin{aligned} \text{(a) Graddiant } AB &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{5 - 2}{8 - -1} \\ &= \frac{3}{9} \\ &= \frac{1}{3} \end{aligned}$$

$$\begin{aligned} \text{(b) Itafaliad } AB: \quad y - y_1 &= m(x - x_1) \\ y - 2 &= \frac{1}{3}(x - -1) \\ 3y - 6 &= x + 1 \\ 3y &= x + 7 \\ y &= \frac{1}{3}x + \frac{7}{3} \end{aligned}$$

(c)  $B = \text{canolbwyt } AC$

$$(8, 5) = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$(8, 5) = \left( \frac{-1 + x_2}{2}, \frac{2 + y_2}{2} \right)$$

Cyfesuryn-x:

$$8 = \frac{-1 + x_2}{2}$$

$$16 = -1 + x_2$$

$$x_2 = 17$$

$$\text{Felly } C = (17, 8)$$

Cyfesuryn-y:

$$5 = \frac{2 + y_2}{2}$$

$$10 = 2 + y_2$$

$$y_2 = 8$$

(ch) (i) Graffiant  $L = \frac{1}{3}$  (parallel i AB)

$$\text{Hafaliad } L: y - y_1 = m(x - x_1)$$

$$y - \frac{1}{6} = \frac{1}{3}(x - 0)$$

$$y + \frac{1}{6} = \frac{1}{3}x$$

$$y = \frac{1}{3}x - \frac{1}{6}$$

(ii) Amnewid  $y = 0$  i meun i hafaliad L:

$$0 = \frac{1}{3}x - \frac{1}{6}$$

$$0 = 2x - 1 \quad (\text{lluosi efo } 6)$$

$$2x = 1$$

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

$$\text{Felly } D = \left( \frac{1}{2}, 0 \right)$$

(iii)  $A = (-1, 2)$   $D = \left( \frac{1}{2}, 0 \right)$

$$\text{Hyd } AD = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$= \sqrt{\left(\frac{1}{2} - -1\right)^2 + (0 - 2)^2}$$

$$= \sqrt{(1.5)^2 + (-2)^2}$$

$$= \sqrt{2.25 + 4}$$

$$= \sqrt{6.25}$$

$$= 2.5 \text{ uned}$$

$$\begin{aligned} \left(\frac{3}{2}\right)^2 &= \frac{3}{2} \times \frac{3}{2} \\ &= \frac{9}{4} \\ &= 2.25 \end{aligned}$$

$$25^2 = 625$$

Haf 2011

①  $A = (3, 1)$   $B = (9, -1)$

(a) Graddiant  $AB = \frac{y_2 - y_1}{x_2 - x_1}$

$$= \frac{-1 - 1}{9 - 3}$$
$$= -\frac{12}{6}$$
$$= -2$$

(b) Graddiant  $L_1 = \frac{1}{2}$  (perpendicular i  $AB$ )

Itafaliad  $L_1$ :  $y - y_1 = m(x - x_1)$   
 $y - -1 = \frac{1}{2}(x - 9)$   
 $y + 1 = \frac{1}{2}x - \frac{9}{2}$   
 $y = \frac{1}{2}x - \frac{11}{2}$  —— ①

(c) (i) Amnewid am  $y$  o ① i mewn i  $6x + 7y + 10 = 0$

$$6x + 7(\frac{1}{2}x - \frac{11}{2}) + 10 = 0$$

$$6x + \frac{7}{2}x - \frac{77}{2} + 10 = 0$$

$$12x + 7x - 77 + 20 = 0 \quad (\text{lluosi efo 2})$$

$$19x - 57 = 0$$

$$19x = 57$$

$x = 3$  → Felly wrth amnewid yn ① i ①

$$y = \frac{1}{2}(3) - \frac{11}{2}$$

$$y = \frac{3}{2} - \frac{11}{2}$$

$$y = -\frac{8}{2}$$

$y = -4$

Felly  $C = (3, -4)$  ✓

$$(ii) B = (9, -1) C = (3, -4)$$

$$\begin{aligned} \text{Hyd } BC &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(3 - 9)^2 + (-4 - -1)^2} \\ &= \sqrt{(-6)^2 + (-3)^2} \\ &= \sqrt{36 + 9} \\ &= \sqrt{45} \\ &= \sqrt{9 \times 5} \\ &= 3\sqrt{5} \text{ uned} \end{aligned}$$

$$\begin{aligned} (iii) \text{ Canolbwynt } BC &= \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \\ &= \left( \frac{9 + 3}{2}, \frac{-1 + -4}{2} \right) \\ &= \left( \frac{12}{2}, \frac{-5}{2} \right) \\ &= (6, -2.5) \end{aligned}$$

$$(iv) A = (3, 1) C = (3, -4)$$

$$\begin{aligned} \text{Graddiant } AC &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{-4 - 1}{3 - 3} \\ &= -\frac{15}{0} \\ &= \infty \end{aligned}$$

Felly llinell fertigol

Itafaliad AC:

$$\underline{x = 3}$$

$(y - y_1 = m(x - x_1))$  ddim  
yn gweithio os yw  $m = \infty.$ )

Gaeaf 2012

①  $A = (-5, 14) \quad B = (1, 2) \quad C = (5, 4) \quad D = (3, 8)$

(a) (i) Graddiant AB

$$\begin{aligned} &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{2 - 14}{1 - -5} \\ &= \frac{-12}{6} \\ &= -2 \end{aligned}$$

Graddiant CD

$$\begin{aligned} &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{8 - 4}{3 - 5} \\ &= \frac{4}{-2} \\ &= -2 \end{aligned}$$

Felly mae AB a CD yn barafol gan bod eu graddiannau (-2) yn hafal.

(ii) Hafaliad AB:

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - 14 &= -2(x - -5) \\ y - 14 &= -2(x + 5) \\ y - 14 &= -2x - 10 \\ y &= -2x + 4 \end{aligned}$$

—①

(iii) Graddiant L =  $\frac{1}{2}$  (perpendicular i AB)

Hafaliad L:  $y - y_1 = m(x - x_1)$

$$y - 8 = \frac{1}{2}(x - 3)$$

$$2y - 16 = x - 3$$

$$0 = x - 2y - 3 + 16$$

$$0 = x - 2y + 13$$

$$x - 2y + 13 = 0$$

✓

—②

(b) (i) Yn amnewid am y o ① i ②:

$$x - 2(-2x + 4) + 13 = 0$$

$$x + 4x - 8 + 13 = 0$$

$$5x + 5 = 0$$

$$5x = -5$$

$x = -1$  → Yn amnewid yn ôl i ①:

$$y = -2(-1) + 4$$

$$y = 2 + 4$$

$$\underline{y = 6}$$

$$\text{Felly } E = (-1, 6)$$

(ii) F = canolbwynt AB

$$A = (-5, 14) \quad B = (1, 2)$$

$$= \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$= \left( \frac{-5 + 1}{2}, \frac{14 + 2}{2} \right)$$

$$= \left( -\frac{4}{2}, \frac{16}{2} \right)$$

$$= (-2, 8)$$

$$E = (-1, 6) \quad F = (-2, 8)$$

$$\text{Hyd } EF = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$= \sqrt{(-2 - -1)^2 + (8 - 6)^2}$$

$$= \sqrt{(-1)^2 + (2)^2}$$

$$= \sqrt{1 + 4}$$

$$= \sqrt{5} \text{ uned.}$$

Haf 2012

①  $A = (-4, 7) \quad B = (2, -1)$

(a) Graddiant  $AB = \frac{y_2 - y_1}{x_2 - x_1}$

$$\begin{aligned} &= \frac{-1 - 7}{2 - -4} \\ &= \frac{-8}{6} \\ &= -\frac{4}{3} \end{aligned}$$

(b) C = canolbwyt AB

$$\begin{aligned} &= \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \\ &= \left( \frac{-4 + 2}{2}, \frac{7 + -1}{2} \right) \\ &= \left( -\frac{2}{2}, \frac{6}{2} \right) \\ &= (-1; 3) \end{aligned}$$

(c) Graddiant  $L = \frac{3}{4}$  (negatif cilydd  $-\frac{4}{3}$ )

Hafaliad L:  $y - y_1 = m(x - x_1)$

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

$$4y - 12 = 3(x + 1)$$

$$4y - 12 = 3x + 3$$

$$0 = 3x - 4y + 3 + 12$$

$$0 = 3x - 4y + 15$$

$$3x - 4y + 15 = 0 \quad \checkmark$$

(ch) Yn amnewid  $x = 7$  i mewn i L:

$$3(7) - 4y + 15 = 0 \rightarrow 36 = 4y$$

$$21 - 4y + 15 = 0 \quad \checkmark \quad y = 9$$

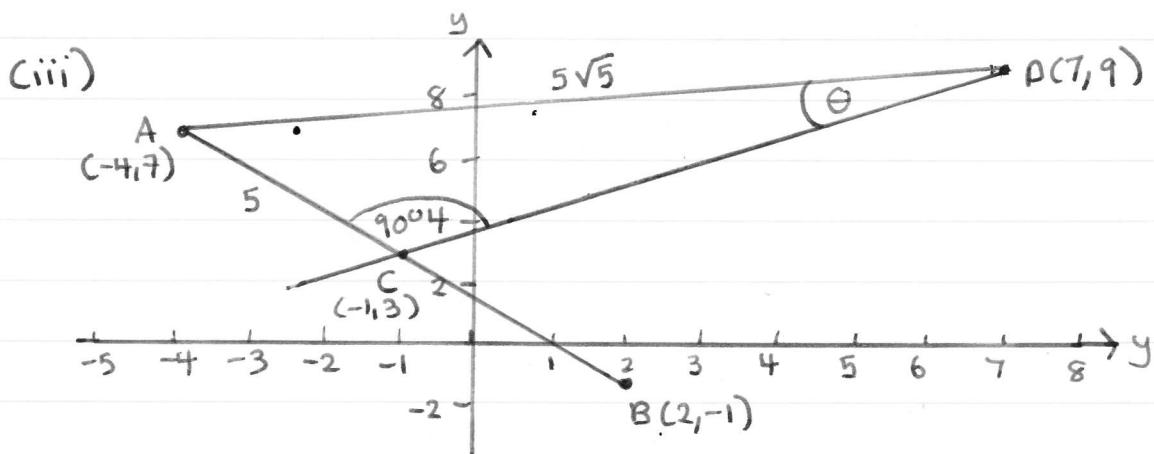
$$36 - 4y = 0 \quad \checkmark \quad \text{Felly } \underline{K = 9} \quad \checkmark$$

$$(ii) C = (-1, 3) \quad A = (-4, 7)$$

$$\begin{aligned} \text{Hyd } CA &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(-4 - -1)^2 + (7 - 3)^2} \\ &= \sqrt{(-3)^2 + (4)^2} \\ &= \sqrt{9 + 16} \\ &= \sqrt{25} \\ &= 5 \text{ uned} \end{aligned}$$

$$D = (7, 9) \quad A = (-4, 7)$$

$$\begin{aligned} \text{Hyd } DA &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(-4 - 7)^2 + (7 - 9)^2} \\ &= \sqrt{(-11)^2 + (-2)^2} \\ &= \sqrt{121 + 4} \\ &= \sqrt{125} \\ &= \sqrt{25 \times 5} \\ &= 5\sqrt{5} \text{ uned.} \end{aligned}$$



$$\sin A \hat{P} C = \frac{\text{cyfevbyn}}{\text{hypotenws}}$$

$$\sin A \hat{P} C = \frac{5}{5\sqrt{5}}$$

$$\sin A \hat{P} C = \frac{1}{\sqrt{5}}$$

(felly  $a = 5$ .)

Gaeaf 2013

①  $A = (2, -3)$   $B = (4, 1)$

$$\begin{aligned}
 \text{(a) Graddiant } AB &= \frac{y_2 - y_1}{x_2 - x_1} \\
 &= \frac{1 - -3}{4 - 2} \\
 &= \frac{4}{2} \\
 &= 2
 \end{aligned}$$

Hafaliad  $AB$ :  $y - y_1 = m(x - x_1)$

$$\begin{aligned}
 y - -3 &= 2(x - 2) \\
 y + 3 &= 2x - 4 \\
 y &= 2x - 7. \quad \text{---(1)}
 \end{aligned}$$

(b) Hafaliad  $L$ :  $x + 2y - 11 = 0 \quad \text{---(2)}$

$$\begin{aligned}
 2y &= -x + 11 \\
 y &= -\frac{1}{2}x + \frac{11}{2}
 \end{aligned}$$

Felly graddiant  $L$  yw  $-\frac{1}{2}$ .

Gran fod  $-\frac{1}{2}$  yn negatif cilydd a (sef graddiant  $AB$ ) mae  $AB$  ag  $L$  yn berpendicwlar.

(c) Yn amnewid am  $y = 0$  (1) i (2):

$$x + 2(2x - 7) - 11 = 0$$

$$x + 4x - 14 - 11 = 0$$

$$5x - 25 = 0$$

$$5x = 25$$

$x = 5$   $\rightarrow$  yn amnewid yn ôl i (1):

$$y = 2 \times 5 - 7$$

$$y = 10 - 7$$

$$\underline{y = 3}$$

Felly  $C = (5, 3)$ .  $\checkmark$

$$(ch) A = (2, -3) B = (4, 1)$$

$$\begin{aligned} \text{Hyd } AB &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(4 - 2)^2 + (1 - -3)^2} \\ &= \sqrt{2^2 + 4^2} \\ &= \sqrt{4 + 16} \\ &= \sqrt{20} \\ &= \sqrt{4 \times 5} \\ &= 2\sqrt{5} \text{ uned} \end{aligned}$$

$$A = (2, -3) C = (5, 3)$$

$$\begin{aligned} \text{Hyd } AC &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(5 - 2)^2 + (3 - -3)^2} \\ &= \sqrt{3^2 + 6^2} \\ &= \sqrt{9 + 36} \\ &= \sqrt{45} \\ &= \sqrt{9 \times 5} \\ &= 3\sqrt{5} \text{ uned} \end{aligned}$$

$$AB = k AC$$

$$2\sqrt{5} = k(3\sqrt{5})$$

$$2 = 3k$$

(rhanu efo  $\sqrt{5}$ )

$$3k = 2$$

$$\underline{k = \frac{2}{3}}$$

Haf 2013

①  $A = (8, 4)$   $B = (6, -5)$   $C = (3, 7)$

(a) (i) Graddiant  $BC = \frac{y_2 - y_1}{x_2 - x_1}$

$$= \frac{7 - -5}{3 - 6}$$
$$= \frac{12}{-3}$$
$$= -4$$

(ii) Hafaliad  $BC$ :  $y - y_1 = m(x - x_1)$

$$y - -5 = -4(x - 6)$$
$$y + 5 = -4x + 24$$
$$4x + y + 5 - 24 = 0$$
$$4x + y - 19 = 0 \quad \checkmark \quad \text{---} \textcircled{1}$$

(iii) Graddiant  $AD = \frac{1}{4}$  (perpendicular i  $BC$ )

Hafaliad  $AD$ :  $y - y_1 = m(x - x_1)$

$$y - 4 = \frac{1}{4}(x - 8)$$
$$y - 4 = \frac{1}{4}x - 2$$
$$y = \frac{1}{4}x + 2 \quad \text{---} \textcircled{2}$$

(b) Yn amnewid am y o  $\textcircled{2}$  i  $\textcircled{1}$ :

$$4x + (\frac{1}{4}x + 2) - 19 = 0$$

$$\frac{16}{4}x + \frac{1}{4}x - 17 = 0$$

$$\frac{17}{4}x = 17$$

$$17x = 68$$

$x = 4$   $\rightarrow$  Yn amnewid yn ôl i  $\textcircled{2}$ :

$$y = \frac{1}{4}(4) + 2$$

$$y = 1 + 2$$

$$\underline{y = 3}$$

Felly  $p = (4, 3)$   $\checkmark$

$$(c) B = (6, -5) D = (4, 3)$$

$$\begin{aligned} \text{Hyd } BD &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(4 - 6)^2 + (3 - -5)^2} \\ &= \sqrt{(-2)^2 + 8^2} \\ &= \sqrt{4 + 64} \\ &= \sqrt{68} \\ &= \sqrt{4 \times 17} \\ &= 2\sqrt{17} \text{ uned} \end{aligned}$$

$$(ch) D = \text{canolbuynyt AE}$$

$$(4, 3) = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$(4, 3) = \left( \frac{8 + x_2}{2}, \frac{4 + y_2}{2} \right)$$

Cyfesuryn-x:

$$4 = \frac{8 + x_2}{2}$$

$$8 = 8 + x_2$$

$$x_2 = 0$$

Cyfesuryn-y:

$$3 = \frac{4 + y_2}{2}$$

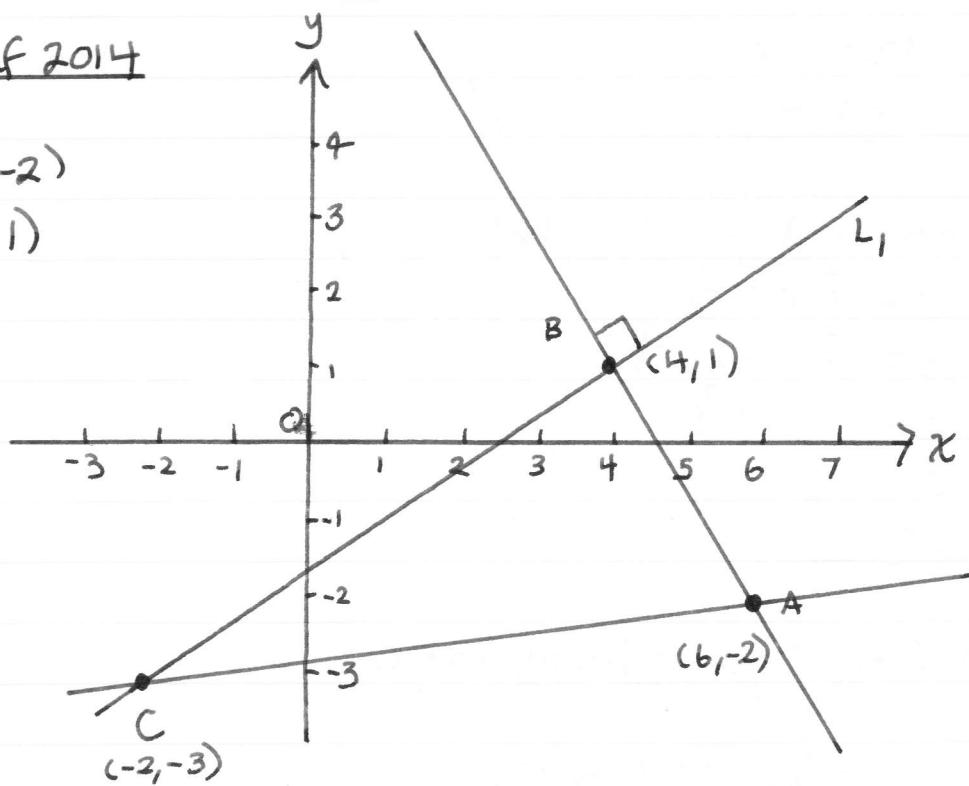
$$6 = 4 + y_2$$

$$y_2 = 2$$

Felly E = (0, 2).

C1 Gaeaf 2014

$$\textcircled{1} \quad A = (6, -2) \\ B = (4, 1)$$



$$\text{(a) (i)} \quad \text{Graddiant } AB = \frac{y_2 - y_1}{x_2 - x_1} \\ = \frac{1 - -2}{4 - 6} \\ = \frac{3}{-2}$$

$$\text{(ii)} \quad \text{Graddiant } L_1 = \frac{2}{3}$$

Hafaliad  $L_1$ :

$$y - y_1 = m(x - x_1) \\ y - 1 = \frac{2}{3}(x - 4) \\ y - 1 = \frac{2}{3}x - \frac{8}{3} \\ y = \frac{2}{3}x - \frac{5}{3}$$

$$\text{(b)} \quad L_2: x - 8y - 22 = 0$$

Yn amnewid am y o hafaliad  $L_1$ :

$$x - 8\left(\frac{2}{3}x - \frac{5}{3}\right) - 22 = 0$$

$$x - \frac{16}{3}x + \frac{40}{3} - 22 = 0$$

$$3x - 16x + 40 - 66 = 0 \quad [\text{Lluosi efo 3}]$$

$$-13x - 26 = 0$$

$$13x + 26 = 0 \quad [\text{Lluosi efo -1}]$$

$$13x = -26$$

$$\underline{x = -2}$$

✓

Yn amnewid ym ôl i hafaliad L<sub>1</sub>:

$$y = \frac{2}{3}x - \frac{5}{3}$$

$$y = \frac{2}{3}(-2) - \frac{5}{3}$$

$$y = -\frac{4}{3} - \frac{5}{3}$$

$$y = -\frac{9}{3}$$

$$\underline{y = -3}$$

✓

Felly (-2, -3) yw cyfesurynnau C.

(ii) A = (6, -2)    C = (-2, -3)

$$\begin{aligned}\text{Canolbwynt AC} &= \left( \frac{x_1+x_2}{2}, \frac{y_1+y_2}{2} \right) \\ &= \left( \frac{6+(-2)}{2}, \frac{-2+(-3)}{2} \right) \\ &= \left( \frac{4}{2}, \frac{-5}{2} \right) \\ &= \underline{(2, -2.5)}\end{aligned}$$

(iii) Pellter AB

$$\begin{aligned}&= \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2} \\ &= \sqrt{(4-6)^2 + (1-(-2))^2} \\ &= \sqrt{(-2)^2 + (3)^2} \\ &= \sqrt{4+9} \\ &= \sqrt{13}\end{aligned}$$

Pellter BC

$$\begin{aligned}&= \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2} \\ &= \sqrt{(-2-4)^2 + (-3-1)^2} \\ &= \sqrt{(-6)^2 + (-4)^2} \\ &= \sqrt{36+16} \\ &= \sqrt{52}\end{aligned}$$

Arwynebedd Triangl ABC

$$= \frac{1}{2} \times \text{sail} \times \text{uchder}$$

$$= \frac{1}{2} \times \text{Pellter AB} \times \text{Pellter BC}$$

$$= \frac{1}{2} \times \sqrt{13} \times \sqrt{52}$$

$$= \frac{1}{2} \times \sqrt{13} \times \sqrt{13} \times \sqrt{4}$$

$$= \frac{1}{2} \times 13 \times 2$$

$$= 13 \text{ uned sgrâr.}$$

Haf 2014

①  $A = (-2, 10)$   $B = (12, 3)$

(a) (i) Graddiant  $AB = \frac{y_2 - y_1}{x_2 - x_1}$

$$= \frac{3 - 10}{12 - -2}$$
$$= \frac{-7}{14}$$
$$= -\frac{1}{2}$$

(ii) Hafaliad  $AB$ :

$$y - y_1 = m(x - x_1)$$
$$y - 10 = -\frac{1}{2}(x - -2)$$
$$y - 10 = -\frac{1}{2}(x + 2)$$
$$2y - 20 = -1(x + 2)$$
$$2y - 20 = -x - 2$$
$$2y = -x + 18$$

—— ①

(b) Mae L yn berpendicwlar i  $AB$  felly graddiant L  
yw 2 (negatif y cilydd).  
Mae L yn mynd trwy'r pwynt  $C = (0, -1)$ .

(i) Hafaliad L:  $y - y_1 = m(x - x_1)$

$$y - -1 = 2(x - 0)$$
$$y + 1 = 2x$$
$$y = 2x - 1$$

—— ②

(ii) Blaenau mae AB ac L yn croesbarri?

Amnewid am y o ② i mewn i ①:

$$2y = -x + 18$$
$$2(2x - 1) = -x + 18$$
$$4x - 2 = -x + 18$$

$$\begin{aligned} & \rightarrow \\ & 5x = 20 \\ & x = 4 \end{aligned}$$

In amnewid yn ôl i ②:  $y = 2x - 1$   
 $y = 2 \times 4 - 1$   
 $y = 8 - 1$   
 $\underline{y = 7}$

Felly  $D = (4, 7)$ . ✓

(iii)  $A = (-2, 10)$   $B = (12, 3)$   $D = (4, 7)$

$$\begin{aligned} \text{Hyd } AD &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(4 - -2)^2 + (7 - 10)^2} \\ &= \sqrt{6^2 + (-3)^2} \\ &= \sqrt{36 + 9} \\ &= \sqrt{45} \\ &= \sqrt{9 \times 5} \\ &= 3\sqrt{5} \end{aligned}$$

$$\begin{aligned} \text{Hyd } BD &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(4 - 12)^2 + (7 - 3)^2} \\ &= \sqrt{(-8)^2 + 4^2} \\ &= \sqrt{64 + 16} \\ &= \sqrt{80} \\ &= \sqrt{16 \times 5} \\ &= 4\sqrt{5} \end{aligned}$$

(c)  $C = (0, -1)$   $D = (4, 7)$ . D yw canolbuynyt CE.

(i)  $E = (8, 15)$ .

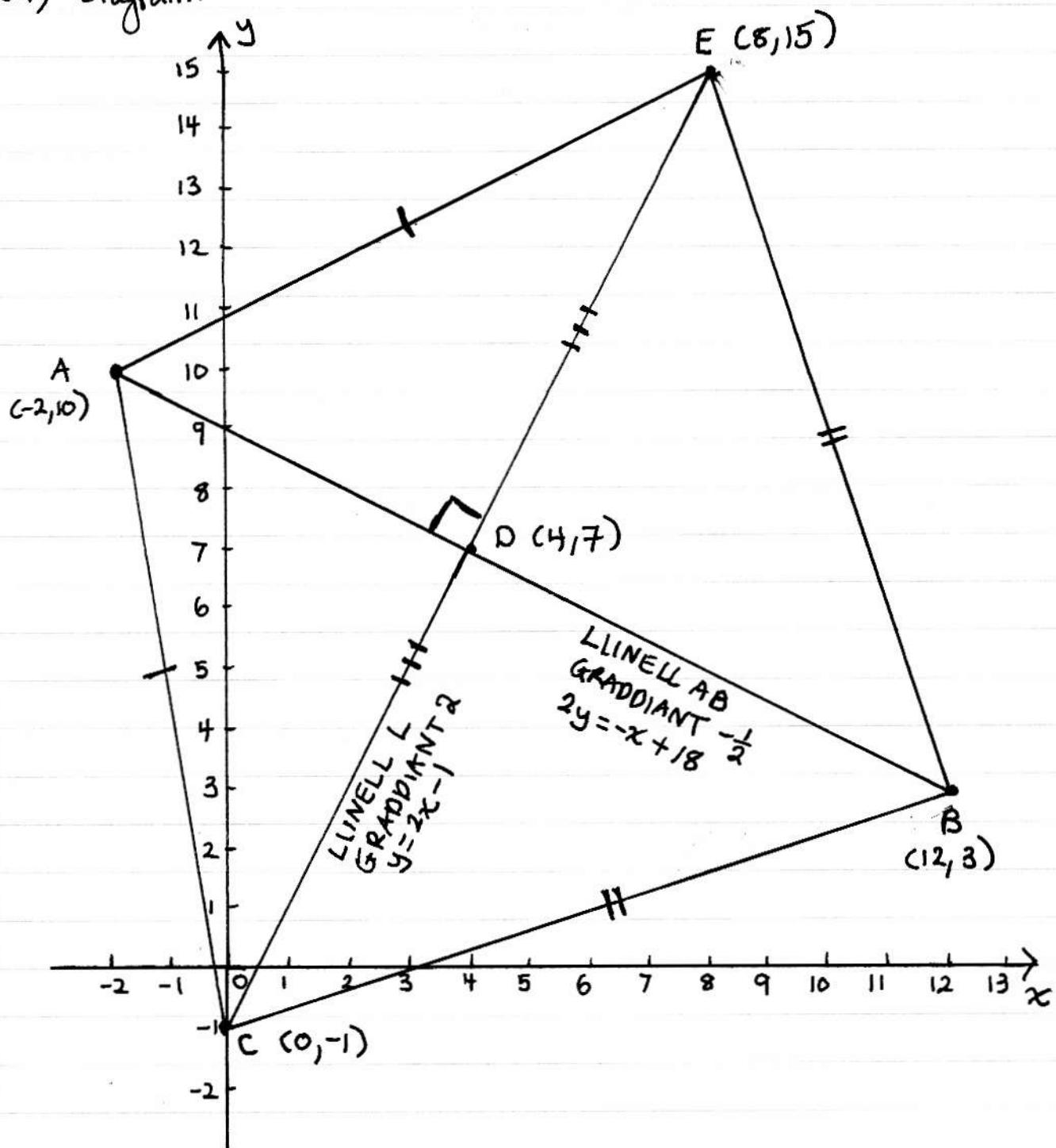
T Gwirio mai D yw canolbuynyt CE:

$$\begin{aligned} D &= \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \\ &= \left( \frac{0 + 8}{2}, \frac{-1 + 15}{2} \right) \end{aligned}$$

$\Rightarrow = \left( \frac{8}{2}, \frac{14}{2} \right)$   
 $= (4, 7)$  ✓



(ii) Diagram:



Mae'r pedrochr ACBE yn farcud.

(Mae ganddo dwy bâr o ochrau cyfagas sy'n hafal, dim ongl mewnl mwy na  $180^\circ$ , croeslinau sydd yn croesi ar ongl sgwâr, ac un llinell o gymesuredd.)

C1 Itaf 2015

i)  $A = (-7, 3)$      $B = (2, 0)$      $C = (-3, 5)$

$$\begin{aligned} \text{(a) (i) Graddiant } AB &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{0 - 3}{2 - -7} \\ &= \frac{-3}{9} \\ &= \underline{\underline{-\frac{1}{3}}} \end{aligned}$$

$$\begin{aligned} \text{(ii) Hafaliad } AB: \quad y - y_1 &= m(x - x_1) \\ y - 3 &= -\frac{1}{3}(x - -7) \\ 3y - 9 &= -(x + 7) \\ 3y - 9 &= -x - 7 \\ 3y + x - 9 + 7 &= 0 \\ \underline{\underline{x + 3y - 2 = 0}} &\quad \checkmark \quad -\textcircled{1} \end{aligned}$$

(iii) Mae Lyn mynd trwy C ac mae'n berpendicular i AB.  
Graddiant L = 3 (negatif y cilydd)

$$\begin{aligned} \text{Hafaliad } L: \quad y - y_1 &= m(x - x_1) \\ y - 5 &= 3(x - -3) \\ y - 5 &= 3x + 9 \\ \underline{\underline{y = 3x + 14}} &\quad -\textcircled{2} \end{aligned}$$

(b) Amnewid am y o  $\textcircled{2}$ ;  $\textcircled{1}$ :

$$x + 3(3x + 14) - 2 = 0$$

$$x + 9x + 42 - 2 = 0$$

$$10x = -40$$

$$\underline{\underline{x = -4}}$$

Amnewid yn ôl yn  $\textcircled{2}$ :

$$y = 3x - 4 + 14$$

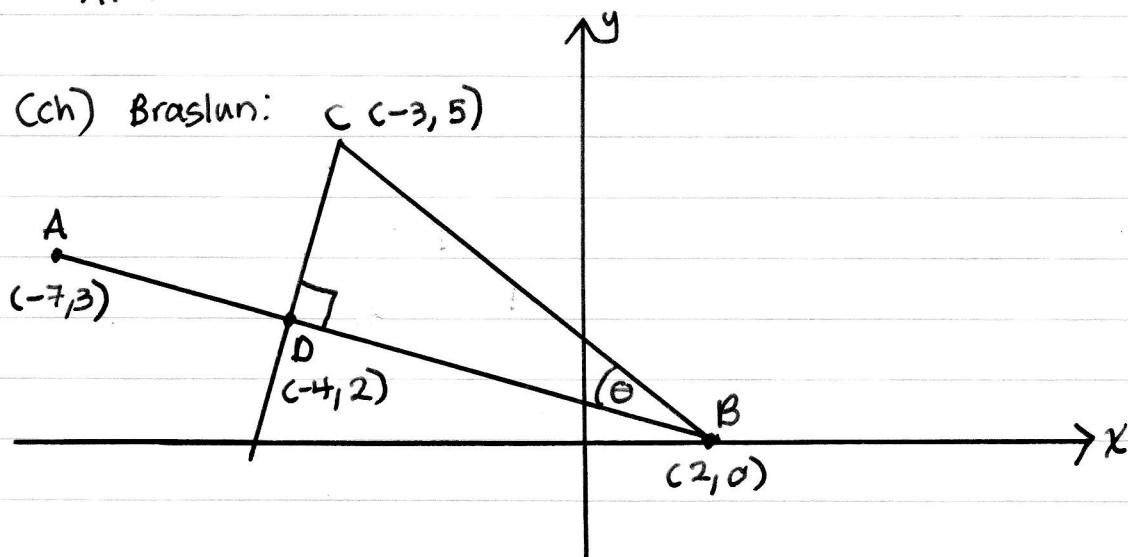
$$y = -12 + 14$$

$$\underline{\underline{y = 2}}$$

Felly  $\underline{\underline{D = (-4, 2)}} \quad \checkmark$

$$\begin{aligned}
 \text{(c)} \quad \text{Canolbwynt } AB &= \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \\
 &= \left( \frac{-7 + 2}{2}, \frac{3 + 0}{2} \right) \\
 &= \left( -\frac{5}{2}, \frac{3}{2} \right)
 \end{aligned}$$

Ond mae L yn cyfarfod AB yn y pwnt D = (-4, 2), nid  $(-\frac{5}{2}, \frac{3}{2})$ , felly nid yw L yn hanerydd perpendicular AB.



$$\begin{aligned}
 \text{Hyd } CD &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\
 &= \sqrt{(-4 - -3)^2 + (2 - 5)^2} \\
 &= \sqrt{(-1)^2 + (-3)^2} \\
 &= \sqrt{1 + 9} \\
 &= \sqrt{10}
 \end{aligned}$$

$$\begin{aligned}
 \text{Hyd } DB &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\
 &= \sqrt{(2 - -4)^2 + (0 - 2)^2} \\
 &= \sqrt{6^2 + (-2)^2} \\
 &= \sqrt{36 + 4} \\
 &= \sqrt{40}
 \end{aligned}$$

$\tan A\hat{B}C = \frac{\text{cyferbyn}}{\text{agos}}$

$$= \frac{\sqrt{10}}{\sqrt{40}}$$

$$= \frac{\sqrt{10}}{\sqrt{10} \times \sqrt{4}}$$

$$= \frac{1}{\sqrt{4}}$$

$$\tan A\hat{B}C = \frac{1}{2}$$

# C1 Haf 2016

$$\textcircled{1} \quad A = (-6, -3) \quad B = (4, 2) \quad C = (-2, 5)$$

a) (i) Graddiant  $AB = \frac{y_2 - y_1}{x_2 - x_1}$

$$= \frac{2 - -3}{4 - -6}$$

$$= \frac{5}{10}$$

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

(ii) Itafaliad  $AB$ :  $y - y_1 = m(x - x_1)$

$$y - -3 = \frac{1}{2}(x - -6)$$

$$y + 3 = \frac{1}{2}(x + 6)$$

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

$$y = \frac{1}{2}x \quad (\text{neu } 2y = x)$$

b) Hyd  $AB$

$$\begin{aligned} &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(4 - -6)^2 + (2 - -3)^2} \\ &= \sqrt{10^2 + 5^2} \\ &= \sqrt{100 + 25} \\ &= \sqrt{125} \\ &= \sqrt{25 \times 5} \\ &= 5\sqrt{5} \end{aligned}$$

Hyd  $AC$

$$\begin{aligned} &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(-2 - -6)^2 + (5 - -3)^2} \\ &= \sqrt{4^2 + 8^2} \\ &= \sqrt{16 + 64} \\ &= \sqrt{80} \\ &= \sqrt{16 \times 5} \\ &= 4\sqrt{5} \end{aligned}$$

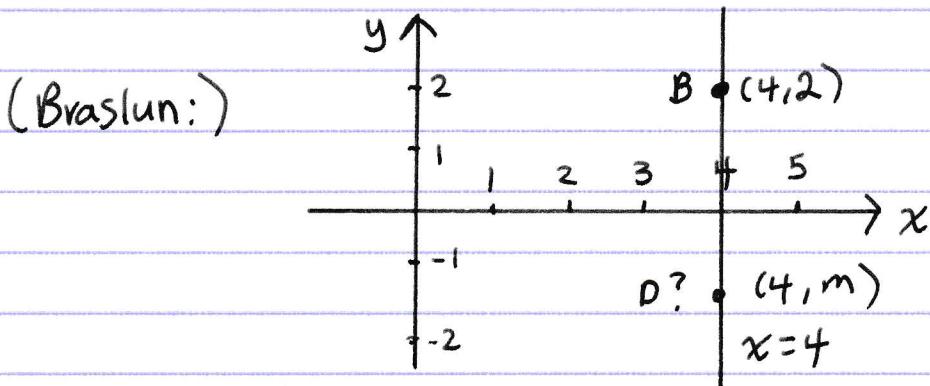
$$\begin{aligned} AB &= K AC \\ 5\sqrt{5} &= K(4\sqrt{5}) \\ 5 &= 4K \end{aligned}$$

$$\begin{aligned} 4K &= 5 \\ K &= \frac{5}{4} \end{aligned}$$

Fel degolyn,  $K = 1.25$

$$c) \quad B = (4, 2) \quad D = (4, m)$$

(i) Sylwch: cyfesuryn  $x$   $B$  a  $D$  yw 4,  
felly hafaliad  $BD$  yw  $\underline{x=4}$ .



$$(ii) \text{ Graddiant } AB = \frac{1}{2}$$

Mae  $CD$  yn berpendicular i  $AB$ , felly  
graddiant  $CD = -2$  (negatif y cilydd).

$$C = (-2, 5) \quad D = (4, m)$$

$$\text{Graddiant } CD = -2$$

$$\frac{y_2 - y_1}{x_2 - x_1} = -2$$

$$x_2 - x_1$$

$$\frac{m - 5}{4 - (-2)} = -2$$

$$\frac{m - 5}{6} = -2$$

$$m - 5 = -2 \times 6$$

$$m - 5 = -12$$

$$m = -12 + 5$$

$$\underline{m = -7}$$

## C1 Haf 2017

i)  $A = (-2, 3)$     $B = (4, 5)$

$$\begin{aligned}
 \text{a) (i) Graddiant } AB &= \frac{y_2 - y_1}{x_2 - x_1} \\
 &= \frac{5 - 3}{4 - -2} \\
 &= \frac{2}{6} \\
 &= \underline{\underline{\frac{1}{3}}}
 \end{aligned}$$

Felly graddiant  $L_1$  yw  $-3$  (negatif y cilydd)

$$\begin{aligned}
 \text{(ii) Itafaliad } L_1: \quad y - y_1 &= m(x - x_1) \\
 y - 5 &= -3(x - 4) \\
 y - 5 &= -3x + 12 \\
 \underline{\underline{y = -3x + 17}}
 \end{aligned}$$

$$\begin{aligned}
 \text{b) } L_1: \quad y &= -3x + 17 \quad \text{--- (1)} \\
 L_2: \quad x + 2y + 1 &= 0 \quad \text{--- (2)}
 \end{aligned}$$

Yn amnewid am y o (1) ; (2):

$$x + 2(-3x + 17) + 1 = 0$$

$$x - 6x + 34 + 1 = 0$$

$$-5x + 35 = 0$$

$$-5x = -35$$

$$\underline{\underline{x = 7}}$$

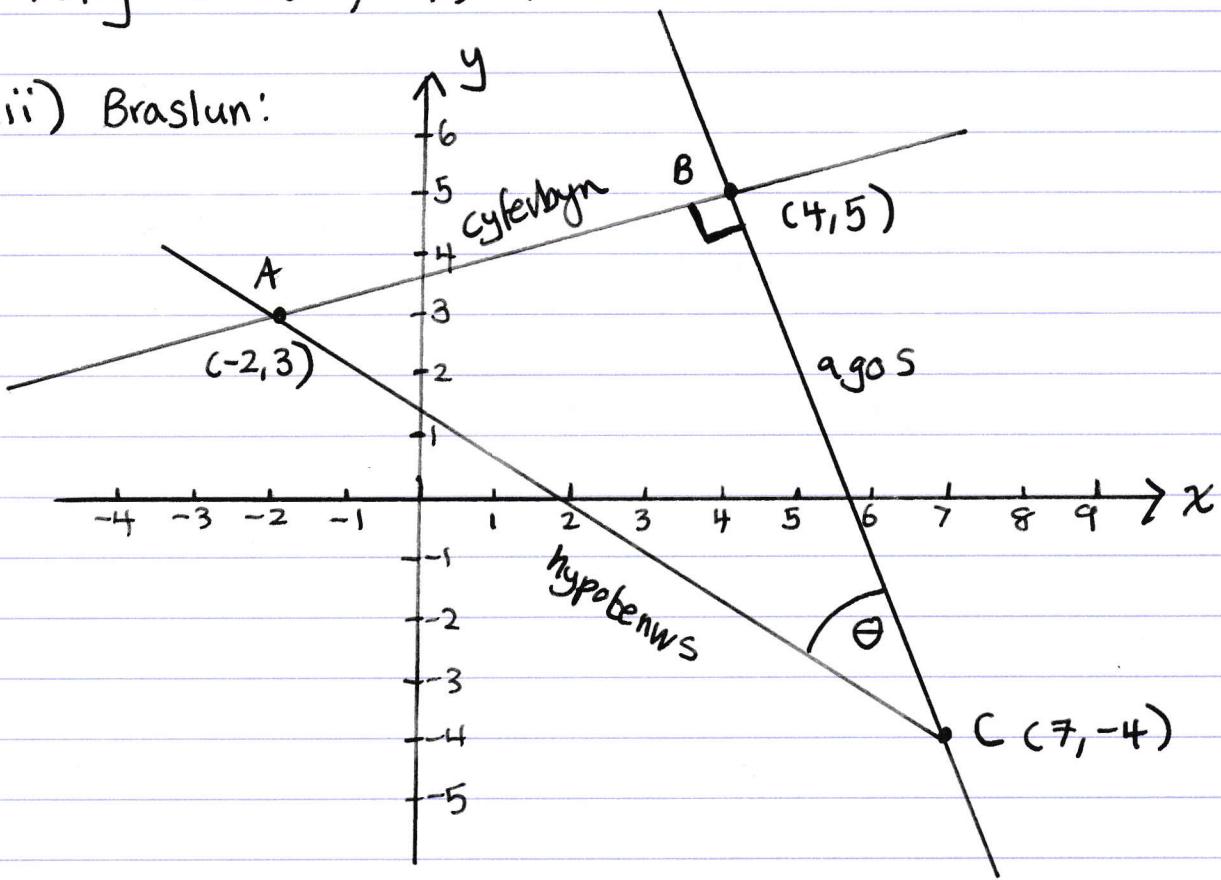
Yn amnewid yn ôl i (1):  $y = -3(7) + 17$

$$y = -21 + 17$$

$$\underline{\underline{y = -4}}$$

Felly  $C = (7, -4)$  ✓

(ii) Braslun:



$$\cos \hat{B}CA = \frac{\text{agos}}{\text{hypotenuss}}$$

$$\cos \hat{B}CA = \frac{\text{Hyd } BC}{\text{Hyd } AC}$$

Hyd BC

$$\begin{aligned} &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(7 - 4)^2 + (-4 - 5)^2} \\ &= \sqrt{3^2 + (-9)^2} \\ &= \sqrt{9 + 81} \\ &= \sqrt{90} \end{aligned}$$

Hyd AC

$$\begin{aligned} &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(7 - -2)^2 + (-4 - 3)^2} \\ &= \sqrt{9^2 + (-7)^2} \\ &= \sqrt{81 + 49} \\ &= \sqrt{130} \end{aligned}$$

$$\begin{aligned}
 \text{Felly } \cos BCA &= \frac{\sqrt{90}}{\sqrt{130}} \\
 &= \frac{\sqrt{9} \times \sqrt{10}}{\sqrt{13} \times \sqrt{10}} \\
 &= \frac{3}{\sqrt{13}} \quad (\text{Felly } a = 13)
 \end{aligned}$$

c) B yw canolbwynt CD

$$\text{Dull 1: } (4, 5) = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$(4, 5) = \left( \frac{7 + x_2}{2}, \frac{-4 + y_2}{2} \right)$$

$$\text{Felly } 4 = \frac{7 + x_2}{2}, \quad 5 = \frac{-4 + y_2}{2}$$

$$8 = 7 + x_2$$

$$10 = -4 + y_2$$

$$x_2 = 1$$

$$y_2 = 14$$

$$\text{Felly } \underline{D = (1, 14)}$$

Dull 2: Trwy edrych ar y braslun, rhaid mynd  
 3 uned i'r chwith a 9 uned i fyny i  
 fynd o C i B. Felly mae'n rhaid mynd  
 3 uned i'r chwith a 9 uned i fyny i  
 fynd o B i D. Felly  $D = (4 - 3, 5 + 9)$   
 $\underline{D = (1, 14)}$

(ii) AB yw hanerydd perpendicolar CD felly mae  
 triaingl ACD yn driangl isosceles.

## C1 Haf 2018

i)  $A = (-2, 7)$   $B = (2, -1)$   $C = (5, 3)$   $D = (3, 7)$

a) i) Graddiant  $AB = \frac{y_2 - y_1}{x_2 - x_1}$       Graddiant  $DC = \frac{y_2 - y_1}{x_2 - x_1}$

$$\begin{aligned} &= \frac{-1 - 7}{2 - -2} \\ &= \frac{-8}{4} \\ &= -2 \end{aligned} \qquad \qquad \qquad \begin{aligned} &= \frac{3 - 7}{5 - 3} \\ &= \frac{-4}{2} \\ &= -2 \end{aligned}$$

Mae  $AB$  a  $DC$  yn baratol gan eu bod efo'r un graddiant  $(-2)$ .

ii) Hafaliad  $AB$ :  $y - y_1 = m(x - x_1)$   
 $y - 7 = -2(x - -2)$   
 $y - 7 = -2x + 4$   
 $y = -2x + 3$

b) L:  $x - 2y + 11 = 0$

i) Ail-drefnu L:  $x - 2y + 11 = 0$   
 $x + 11 = 2y$   
 $\frac{1}{2}x + \frac{11}{2} = y$   
 $y = \frac{1}{2}x + \frac{11}{2}$

Graddiant L yw  $\frac{1}{2}$ .

Mae L yn berpendicular i AB gan fod  
 graddiant AB  $\times$  graddiant L  $= -2 \times \frac{1}{2}$   
 $= -1$ .

(Neu mae graddiant AB yn negatif cilydd graddiant L.)

$$\text{ii) AB: } y = -2x + 3 \quad L: x - 2y + 11 = 0$$

(1) (2)

Yn amnewid am y o (1) i (2):

$$x - 2(-2x + 3) + 11 = 0$$

$$x + 4x - 6 + 11 = 0$$

$$5x + 5 = 0$$

$$5x = -5$$

$$\underline{x = -1}$$

Yn amnewid yn ôl i (1):  $y = -2x - 1 + 3$

$$y = 2 + 3$$

$$\underline{y = 5}$$

Felly  $E = (-1, 5)$  ✓

iii) F = canolbwynt AB

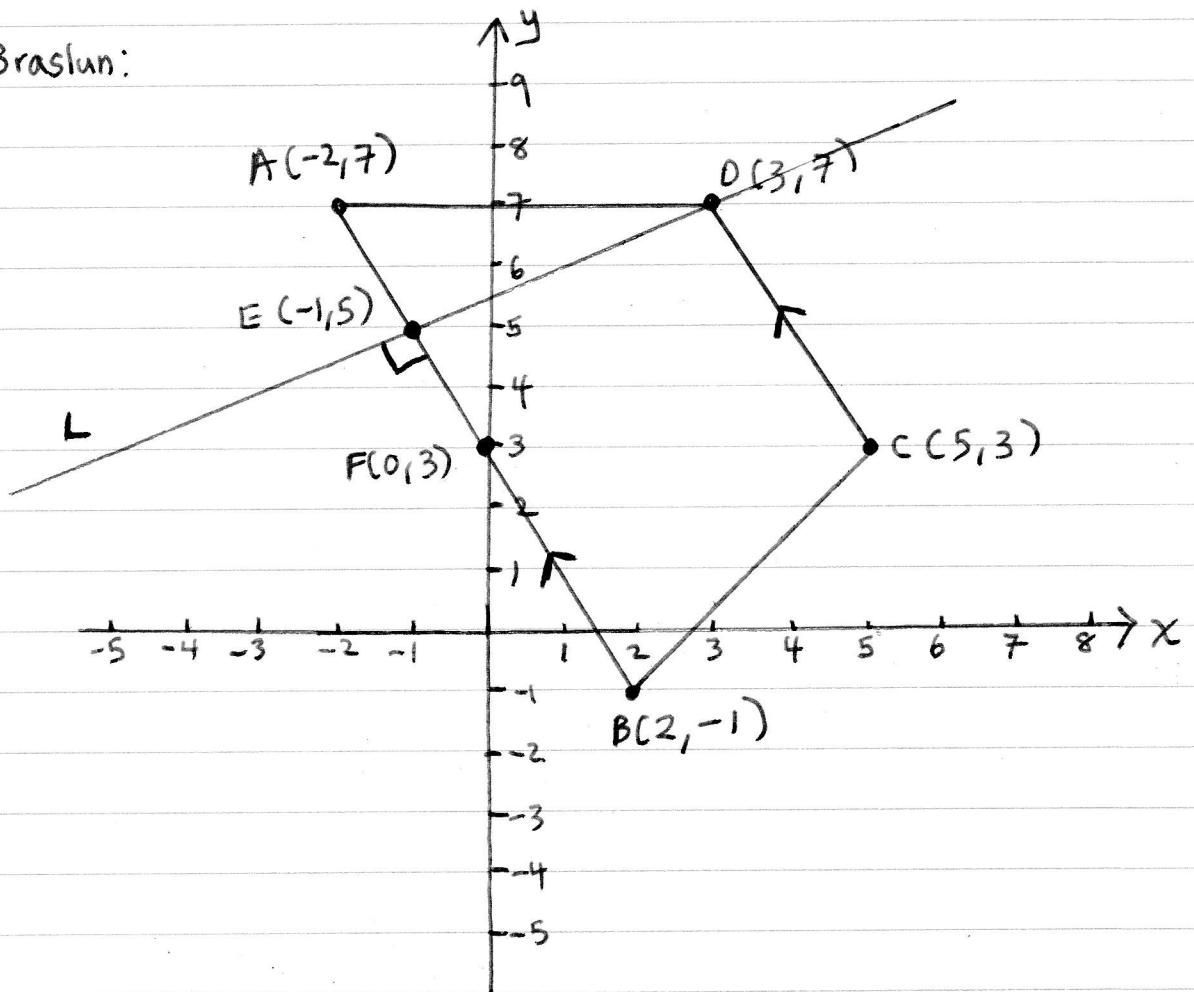
$$= \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$= \left( \frac{-2 + 2}{2}, \frac{7 + -1}{2} \right)$$

$$= \underline{(0, 3)}$$

$$\begin{aligned} \text{Hyd } EF &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(0 - -1)^2 + (3 - 5)^2} \\ &= \sqrt{1^2 + (-2)^2} \\ &= \sqrt{1 + 4} \\ &= \sqrt{5} \end{aligned}$$

c) Braslyn:



Mae'r pedrochr ABCD yn drapesium isosceles.