C1: Y Gwahaniaeth

Gaeaf 2006

⑤ $(k+2)x^2 + 4x + k + 5 = 0$

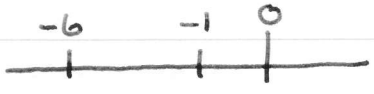
Dim gwreiddiau real felly $b^2 - 4ac < 0$

$$4^2 - 4(k+2)(k+5) < 0$$
$$16 - 4(k^2 + 5k + 2k + 10) < 0$$
$$16 - 4(k^2 + 7k + 10) < 0$$
$$16 - 4k^2 - 28k - 40 < 0$$
$$-4k^2 - 28k - 24 < 0$$
$$-k^2 - 7k - 6 < 0$$
$$k^2 + 7k + 6 > 0 \quad \checkmark$$

$k^2 + 7k + 6 > 0$

$(k+1)(k+6) > 0$

Gwerthoedd critigol $k = -1$, $k = -6$



Graff siâp U felly'r ateb yw $k < -6$ neu $k > -1$.

Haf 2006

④ (a) $kx^2 - 4x + k - 3 = 0$.

Gwreiddiau hafal felly $b^2 - 4ac = 0$

$$(-4)^2 - 4(k)(k-3) = 0$$
$$16 - 4(k^2 - 3k) = 0$$
$$16 - 4k^2 + 12k = 0$$
$$4 - k^2 + 3k = 0$$
$$0 = k^2 - 3k - 4$$
$$0 = (k-4)(k+1)$$

Unai $k - 4 = 0$ neu $k + 1 = 0$

$k = 4$ $\quad$ $k = -1$

Gaeaf 2007

(7) $Kx^2 - 4x + (K-3) = 0$

Gwreiddiau real felly $b^2 - 4ac \geq 0$

$(-4)^2 - 4(K)(K-3) \geq 0$

$16 - 4(K^2 - 3K) \geq 0$

$16 - 4K^2 + 12K \geq 0$

$4 - K^2 + 3K \geq 0$

$-K^2 + 3K + 4 \geq 0$

$K^2 - 3K - 4 \leq 0$ ✓

$K^2 - 3K - 4 \leq 0$

$(K-4)(K+1) \leq 0$

Gwerthoedd critigol $K = 4, K = -1$

Graff siâp U felly ateb $-1 \leq K \leq 4$

Haf 2007

(8) $x^2 + (2K+1)x + (K^2 + K + 1) = 0.$

Beth yw $b^2 - 4ac$?

$b^2 - 4ac = (2K+1)^2 - 4(1)(K^2 + K + 1)$

$= (2K+1)(2K+1) - 4(K^2 + K + 1)$

$= (4K^2 + 2K + 2K + 1) - (4K^2 + 4K + 4)$

$= \cancel{4K^2} + \cancel{4K} + 1 - \cancel{4K^2} - \cancel{4K} - 4$

$= -3.$

Felly $b^2 - 4ac = -3$ dim ots beth yw gwerth K. Gan fod hwn yn negatif, nid oes gan yr hafaliad wreiddiau real ($b^2 - 4ac < 0$ pa beth bynnag yw gwerth K).

Gaeaf 2008

(5) (a) $3x^2 + 2x - K = 0$

Er mwyn cael dau wreiddyn real gwahanadwy rhaid cael $b^2 - 4ac > 0$

$2^2 - 4(3)(-K) > 0$

$4 + 12K > 0$

$12K > -4$

$K > -\frac{4}{12}$

$K > -\frac{1}{3}$

Haf 2008

(10) (a) $2x^2 - 3x - 9 \geqslant 0$

$(2x + 3)(x - 3) \geqslant 0$

Gwerthoedd critigol: $2x + 3 = 0$ $\quad x - 3 = 0$

$2x = -3$ $\quad x = 3$

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

Graff siâp U felly'r ateb yw $x \leqslant -\frac{3}{2}$ neu $x \geqslant 3$

(b) (i) $3x^2 - 6x + m = 0$

Dim gwreiddiau real yn golygu $b^2 - 4ac < 0$

$(-6)^2 - 4(3)(m) < 0$

$36 - 12m < 0$

$-12m < -36$

$m > \frac{-36}{-12}$

$m > 3$

(ii) Os nad yw La C yn croestorri, yna nid oes datrysiadau real ir hafaliad

$3x^2 - 4x + 7 = 2x + K$

$3x^2 - 6x + 7 - K = 0$

$a=3,\ b=-6,\ c=7-K.$

Dim datrysiadau real felly $b^2-4ac<0$

$(-6)^2-4(3)(7-K)<0$

$36-12(7-K)<0$

$36-84+12K<0$

$-48+12K<0$

$12K<48$

$K<4$

Dull 2: Datrys
$7-K>3$ (a ddaw o
$m>3$ gyda $m=7-K$)
i gael $K<4$ etc.

Gaeaf 2009

⑤ $(3K-2)x^2+8x+K=0$

$a=3K-2 \quad b=8 \quad c=K$

Dim gwreiddiau real felly $b^2-4ac<0$

$8^2-4(3K-2)(K)<0$

$64-4(3K^2-2K)<0$

$64-12K^2+8K<0$

$16-3K^2+2K<0$

$-3K^2+2K+16<0$

$3K^2-2K-16>0$ ✓

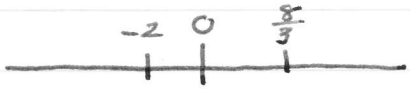
$3K^2-2K-16>0$

$(3K-8)(K+2)>0$

Gwerthoedd critigol $3K-8=0$ $\quad K+2=0$

$3K=8$ $\quad K=-2$

$K=\frac{8}{3}$



Graff siâp U felly ateb $K<-2$ neu $K>\frac{8}{3}$

Haf 2009

⑥ (a) $(K+1)x^2 + 2Kx + (K-1) = 0$

$a = K+1 \quad b = 2K \quad c = K-1$

Beth yw $b^2 - 4ac$?

$$\begin{aligned} b^2 - 4ac &= (2K)^2 - 4(K+1)(K-1) \\ &= 4K^2 - 4(K^2 - K + K - 1) \\ &= 4K^2 - 4(K^2 - 1) \\ &= 4K^2 - 4K^2 + 4 \\ &= 4. \end{aligned}$$

Mae 4 yn bositif, felly mae gan yr hafaliad cwadratig ddau wreiddyn real gwahanadwy dim ots beth yw gwerth K (ar wahân i $K = -1$) gan fod $b^2 - 4ac > 0$.

(b) $5x^2 + 7x - 6 \leq 0$

$(5x - 3)(x + 2) \leq 0$

Gwerthoedd critigol $5x - 3 = 0$ $\quad x + 2 = 0$

$5x = 3 \quad x = -2$

$x = \frac{3}{5}$

Graff siâp U felly'r ateb yw $\underline{-2 \leq x \leq \frac{3}{5}}$

Gaeaf 2010

⑤ (a) $Kx^2 + 3K - 5 = 0$

$a = K \quad b = 3 \quad c = -5$

Dim gwreiddiau real felly $b^2 - 4ac < 0$

$$\begin{aligned} 3^2 - 4(K)(-5) &< 0 \\ 9 + 20K &< 0 \\ 20K &< -9 \\ K &< -\frac{9}{20} \end{aligned}$$

(b) $2x^2 - x - 6 > 0$

$(2x + 3)(x - 2) > 0$

Gwerthoedd critigol $2x + 3 = 0$ $\quad x - 2 = 0$

$2x = -3$ $\quad x = 2$

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

Graff siâp U felly'r ateb yw $\underline{x < -\frac{3}{2}}$ neu $\underline{x > 2}$

Haf 2010

(6) (a) $2x^2 + kx + 18 = 0$

$a = 2 \quad b = k \quad c = 18$

Dim gwreiddiau real felly $b^2 - 4ac < 0$

$k^2 - 4(2)(18) < 0$

$k^2 - 144 < 0$

$k^2 < 144$

Unai $k < \sqrt{144}$ neu $k > -\sqrt{144}$

$k < 12$ $\quad k > -12$

Felly $\underline{-12 < k < 12}$

(b) $10x^2 - x - 3 \geqslant 0$

$(5x - 3)(2x + 1) \geqslant 0$

Gwerthoedd critigol $5x - 3 = 0$ $\quad 2x + 1 = 0$

$5x = 3$ $\quad 2x = -1$

$x = \frac{3}{5}$ $\quad x = -\frac{1}{2}$

Graff siâp U felly'r ateb yw

$\underline{x \leqslant -\frac{1}{2}}$ neu $\underline{x \geqslant \frac{3}{5}}$

Gaeaf 2011

③ $2x^2 + (3k-1)x + (3k^2-1) = 0$

$a = 2 \quad b = 3k-1 \quad c = 3k^2-1$

Dau wreiddyn real gwahanadwy felly $b^2-4ac > 0$

$$(3k-1)^2 - 4(2)(3k^2-1) > 0$$
$$(3k-1)(3k-1) - 8(3k^2-1) > 0$$
$$(9k^2-3k-3k+1) - (24k^2-8) > 0$$
$$(9k^2-6k+1) - 24k^2 + 8 > 0$$
$$-15k^2-6k+9 > 0$$
$$-5k^2-2k+3 > 0$$
$$5k^2+2k-3 < 0 \quad \checkmark$$

$5k^2+2k-3 < 0$

$(5k-3)(k+1) < 0$

Gwerthoedd critigol $5k-3=0 \quad k+1=0$

$5k=3 \quad k=-1$

$k=\frac{3}{5}$

Graff siâp U · felly'r ateb yw $-1 < k < \frac{3}{5}$

Haf 2011

⑤ $y = x^2 + (4k+3)x + 7$ — cromlin C

$y = x + k$ — llinell L

Mae C ag L yn croestorri ble mae

$$x^2 + (4k+3)x + 7 = x + k$$
$$x^2 + (4k+3)x - x + 7 - k = 0$$
$$x^2 + (4k+3-1)x + (7-k) = 0$$
$$x^2 + (4k+2)x + (7-k) = 0.$$

Os yw L ac C yn croestorri mewn dau bwynt gwahanadwy, yna $b^2-4ac > 0$.

$a = 1 \qquad b = 4k+2 \qquad c = 7-k$

$b^2 - 4ac > 0$

$(4k+2)^2 - 4(1)(7-k) > 0$

$(4k+2)(4k+2) - 4(7-k) > 0$

$(16k^2 + 8k + 8k + 4) - (28 - 4k) > 0$

$16k^2 + 16k + 4 - 28 + 4k > 0$

$16k^2 + 20k - 24 > 0$

$4k^2 + 5k - 6 > 0$ ✓

(b) $4k^2 + 5k - 6 > 0$

$(4k - 3)(k + 2) > 0$

Gwerthoedd critigol $4k - 3 = 0$ $\qquad k + 2 = 0$

$4k = 3 \qquad k = -2$

$k = \frac{3}{4}$

Graff siâp U felly ateb $\underline{k < -2}$ neu $\underline{k > \frac{3}{4}}$

<u>Gaeaf 2012</u>.

(6) $(k+6)x^2 + 4x + (k+3) = 0$

$a = k+6 \qquad b = 4 \qquad c = k+3$

Dim gwreiddiau real felly $b^2 - 4ac < 0$

$4^2 - 4(k+6)(k+3) < 0$

$16 - 4(k^2 + 3k + 6k + 18) < 0$

$16 - 4(k^2 + 9k + 18) < 0$

$16 - 4k^2 - 36k - 72 < 0$

$-4k^2 - 36k - 56 < 0$

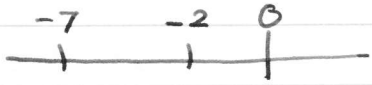
$-k^2 - 9k - 14 < 0$

$k^2 + 9k + 14 > 0$ ✓

$K^2 + 9K + 14 > 0$

$(K+2)(K+7) > 0$

Gwerthoedd critigol $K = -2$, $K = -7$



Graff siâp U felly ateb $K < -7$ neu $K > -2$

Haf 2012

(6) (a) $x^2 + (2K-1)x + (K^2 - K + 2) = 0$

$a = 1 \quad b = 2K-1 \quad c = K^2 - K + 2$

Beth yw $b^2 - 4ac$?

$$b^2 - 4ac = (2K-1)^2 - 4(1)(K^2 - K + 2)$$
$$= (2K-1)(2K-1) - 4(K^2 - K + 2)$$
$$= (4K^2 - 2K - 2K + 1) - 4K^2 + 4K - 8$$
$$= 4K^2 - 4K + 1 - 4K^2 + 4K - 8$$
$$= -7.$$

Gan fod -7 yn negatif nid oes gan yr hafaliad cwadratig wreiddiau real, beth bynnag fydd gwerth y cysonyn K. (Mae $b^2 - 4ac < 0$ ar gyfer pob gwerth K.)

(b) $3x^2 + 16x - 12 > 0$

$(3x - 2)(x + 6) > 0$

Gwerthoedd critigol $3x - 2 = 0$ $\quad x + 6 = 0$

$3x = 2 \quad x = -6$

$x = \frac{2}{3}$

Mae'r graff yn siâp U felly'r ateb yw $\underline{x < -6}$ neu $\underline{x > \frac{2}{3}}$

Gaeaf 2013

(5) (a) $5x^2 + 6x - 3k = 0$

$a = 5 \quad b = 6 \quad c = -3k$

Dau wreiddyn real gwahanadwy felly $b^2 - 4ac > 0$

$6^2 - 4(5)(-3k) > 0$

$36 + 60k > 0$

$60k > -36$

$5k > -3$

$k > -\frac{3}{5}$

(b) $2x^2 - 11x + 15 \leq 0$

$(2x - 5)(x - 3) \leq 0$

Gwerthoedd critigol $2x - 5 = 0$ $\quad x - 3 = 0$

$2x = 5 \quad x = 3$

$x = \frac{5}{2}$

Mae'r graff yn siâp U felly'r ateb yw $\frac{5}{2} \leq x \leq 3$

Haf 2013

(6) (a) $(k+1)x^2 + (4k+1)x + (k-5) = 0$

$a = k+1 \quad b = 4k+1 \quad c = k-5$

Dau wreiddyn hafal felly $b^2 - 4ac = 0$

$(4k+1)^2 - 4(k+1)(k-5) = 0$

$(4k+1)(4k+1) - 4(k^2 - 5k + k - 5) = 0$

$(16k^2 + 4k + 4k + 1) - 4(k^2 - 4k - 5) = 0$

$16k^2 + 8k + 1 - 4k^2 + 16k + 20 = 0$

$12k^2 + 24k + 21 = 0$

$4k^2 + 8k + 7 = 0$ ✓

(ii) Ar gyfer $4k^2+8k+7=0$, beth yw b^2-4ac?

$b^2-4ac = 8^2-4(4)(7)$

$= 64 - 16\times 7$

$= 64 - 112$

$= -48$

$16 \times 7 = 112$

$112 \div 4$

Gan fod hwn yn negatif ($b^2-4ac<0$) nid oes gan yr hafaliad cwadratig $4k^2+8k+7=0$ wreiddiau real. Felly, nid oes unrhyw werthoedd real o k fel bod ir hafaliad cwadratig

$$(k+1)x^2+(4k+1)x+(k-5)=0$$

ddau wreiddyn hafal.

(b) $4x^2-9x-9 \geq 0$

$(4x+3)(x-3) \geq 0$

Gwerthoedd critigol $4x+3=0$ $\quad x-3=0$

$4x=-3$ $\quad x=3$

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

Graff siâp U felly ateb $\underline{x \leq -\frac{3}{4}}$ neu $\underline{x \geq 3}$

C1 Gaeaf 2014

(6) $(2K-3)x^2 + 8x + (2K+3) = 0$

$a = (2K-3)$ $\quad b = 8$ $\quad c = (2K+3)$

Dim gwreiddiau real felly $b^2 - 4ac < 0$

$8^2 - 4(2K-3)(2K+3) < 0$

$64 - 4(4K^2 + 6K - 6K - 9) < 0$

$64 - 4(4K^2 - 9) < 0$

$64 - 16K^2 + 36 < 0$

$100 - 16K^2 < 0$

$25 - 4K^2 < 0$ [rhannu efo 4]

(Felly $m = 25$, $n = 4$)

Dabrys: $25 - 4K^2 < 0$

$25 < 4K^2$

$4K^2 > 25$

$K^2 > \frac{25}{4}$

Unai $K > \sqrt{\frac{25}{4}}$ neu $K < -\sqrt{\frac{25}{4}}$

$K > \frac{5}{2}$ $\quad K < -\frac{5}{2}$

$K > 2.5$ neu $K < -2.5$

Haf 2014

⑥ $(k-1)x^2 + 2kx + (7k-4) = 0$

Dim gwreiddiau real felly $b^2 - 4ac < 0$

$(2k)^2 - 4(k-1)(7k-4) < 0$

$4k^2 - 4(7k^2 - 4k - 7k + 4) < 0$

$4k^2 - 4(7k^2 - 11k + 4) < 0$

$4k^2 - 28k^2 + 44k - 16 < 0$

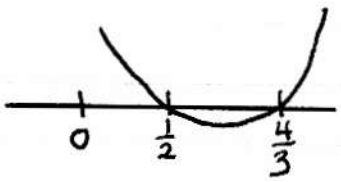
$-24k^2 + 44k - 16 < 0$

$6k^2 - 11k + 4 > 0$ [rhannu efo -4]

✓

$6k^2 - 11k + 4 > 0$

$(2k - 1)(3k - 4) > 0$



Gwerthoedd critigol $k = \frac{1}{2}$, $k = \frac{4}{3}$

Graff siâp ∪ Felly'r ateb yw $k < \frac{1}{2}$ neu $k > \frac{4}{3}$

CI Haf 2015

(5) (a) $Kx^2 + (2K-5)x + (K-6) = 0$

Dim gwreiddiau real felly $b^2 - 4ac < 0$

$(2K-5)^2 - 4(K)(K-6) < 0$

$(2K-5)(2K-5) - 4K(K-6) < 0$

$4K^2 - 10K - 10K + 25 - 4K^2 + 24K < 0$

$4K + 25 < 0$

$4K < -25$

$K < -\frac{25}{4}$

(b) Dau wreiddyn hafal felly $b^2 - 4ac = 0$

$(2K-5)^2 - 4(K)(K-6) = 0$

$K = -\frac{25}{4}$

C1 Haf 2016

(6) $9x^2 + 8x - 2k = 0$

a) Dau wreiddyn real gwahanadwy yn golygu bod $b^2 - 4ac > 0$

$a = 9, \quad b = 8, \quad c = -2k$

$8^2 - 4(9)(-2k) > 0$

$64 - 36(-2k) > 0$

$64 + 72k > 0$

$72k > -64$

$k > -\frac{64}{72}$

$k > -\frac{8}{9}$

b) $x(5x - 7) \geqslant 6$

$5x^2 - 7x \geqslant 6$

$5x^2 - 7x - 6 \geqslant 0$

$(5x + 3)(x - 2) \geqslant 0$

Pwyntiau critigol: $5x + 3 = 0$ $\qquad$ $x - 2 = 0$

$5x = -3$ $\qquad$ $x = 2$

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

$5x^2 - 7x - 6$ felly siâp $\cup$

Datrysiad $x \leqslant -\frac{3}{5}$ neu $x \geqslant 2$.

(7 Hag 2019

6). a) $x^2 + (2k-5)x + (k^2 - 5k + 8) = 0$

$a = 1 \quad b = 2k - 5 \quad c = k^2 - 5k + 8$

$b^2 - 4ac = (2k-5)^2 - 4(1)(k^2 - 5k + 8)$

$= (2k-5)(2k-5) - 4(k^2 - 5k + 8)$

$= (4k^2 - 10k - 10k + 25) - 4k^2 + 20k - 32$

$= 4k^2 - 20k + 25 - 4k^2 + 20k - 32$

$= -7$

Gan fod -7 yn negatif nid oes gan yr hafaliad cwadratig unrheddiau real, beth bynnag fydd gwerth y cysonyn K.

($b^2 - 4ac < 0$ ar gyfer pob gwerth x).

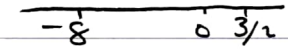
b) $2x^2 + 13x - 24 < 0$

$(2x - 3)(x + 8) < 0$

Gwerthoedd critigol $2x - 3 = 0$ $\quad x + 8 = 0$

$2x = 3 \quad x = -8$

$x = 3/2$



Mae'r graph yn siap U felly rydyn ni'n gwybod yw $-8 < x < 3/2$