

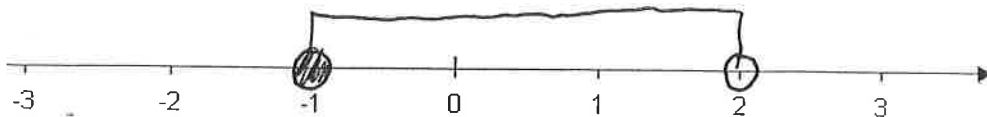
VMA

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LauM

1. (5%) Sýndu talnabilið á talnalínu:

$$\{x \in \mathbb{R} \mid -1 \leq x < 2\}$$



2. (5%) Fullþáttaðu töluna

32186

$$\begin{array}{r|l} 32186 & 16093 \\ \hline 2 & 7 \\ \hline & 11 \\ & 11 \\ & 19 \\ & 1 \end{array}$$

3. (6%) Fullþáttaðu

$$49x^2 - 25y^2$$

$$(7x)^2 - (5y)^2$$

$$(7x + 5y)(7x - 5y)$$

4. (12%) Þáttaðu og stytstu eins og unnt er

$$\frac{x^2+3x-10}{2x^2-18} \cdot \frac{x^2+6x+5}{3x^2+6x-9}$$

$$\frac{(x+5)(x-2)}{2(x+3)(x-3)} \cdot \frac{3(x^2+2x-3)}{(x+1)(x+5)}$$

$$\frac{\cancel{(x+5)}(x-2)}{2\cancel{(x+3)}(x-3)} \cdot \frac{3\cancel{(x+3)}(x-1)}{(x+1)\cancel{(x+5)}} = \frac{3(x-2)(x-1)}{2(x-3)(x+1)}$$

5. (8%) Einfaldaðu

$$\frac{x}{5} + \frac{3x}{10} - \frac{2x}{3}$$

$$\frac{x \cdot 6}{5 \cdot 6} + \frac{3x \cdot 3}{10 \cdot 3} - \frac{2x \cdot 10}{3 \cdot 10}$$

$$\frac{6x + 9x - 20x}{30} = \frac{-5x}{30} = \frac{-x}{6}$$

6. (8%) Einfaldaðu

$$\frac{(2^2 \cdot x^4 \cdot y^{-2})^2}{(2^{-1} y^3 \cdot x^3)^{-2}} = \frac{2^4 x^8 y^{-4}}{2^2 y^{-6} x^{-6}} = 2^2 x^{14} y^2$$

7. (12%) Leystu eftirfarandi jöfnur.

a)  $12x^2 + 5x - 2 = 0$

$A=12$        $D = 5^2 - 4 \cdot 12 \cdot (-2)$   
 $B=5$        $D = 25 + 96$   
 $C=-2$        $D = 121$

$$x_1 = \frac{-5 + \sqrt{121}}{2 \cdot 12} = \frac{-5 + 11}{24} = \frac{6}{24} = \frac{1}{4}$$

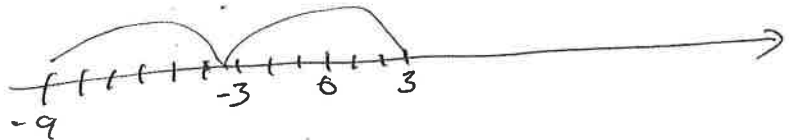
$$x_2 = \frac{-5 - \sqrt{121}}{2 \cdot 12} = \frac{-5 - 11}{24} = \frac{-16}{24} = -\frac{2}{3}$$

b)  $|x + 3| = 6$

$$(x+3)^2 = 6^2$$

$$x^2 + 6x + 9 = 36$$

$$x^2 + 6x - 27 = 0$$



$A=1$        $D = 6^2 - 4 \cdot 1 \cdot (-27)$   
 $B=6$        $D = 144$   
 $C=-27$

$$x_1 = \frac{-6 + 12}{2 \cdot 1} = \frac{6}{2} = 3$$

$$x_2 = \frac{-6 - 12}{2 \cdot 1} = \frac{-18}{2} = -9$$

8. Jafna fleygboga er gefin  $y = x^2 - 4x - 5$

a) (5%) Finndu hnit topppunktsins og samhverfuásinn.

$$T = \left( \frac{-(-4)}{2 \cdot 1}, \frac{-36}{4 \cdot 1} \right) = (2, -9) \quad x = 2$$

$$D = (-4)^2 - 4 \cdot 1 \cdot (-5)$$

$$D = 16 + 20$$

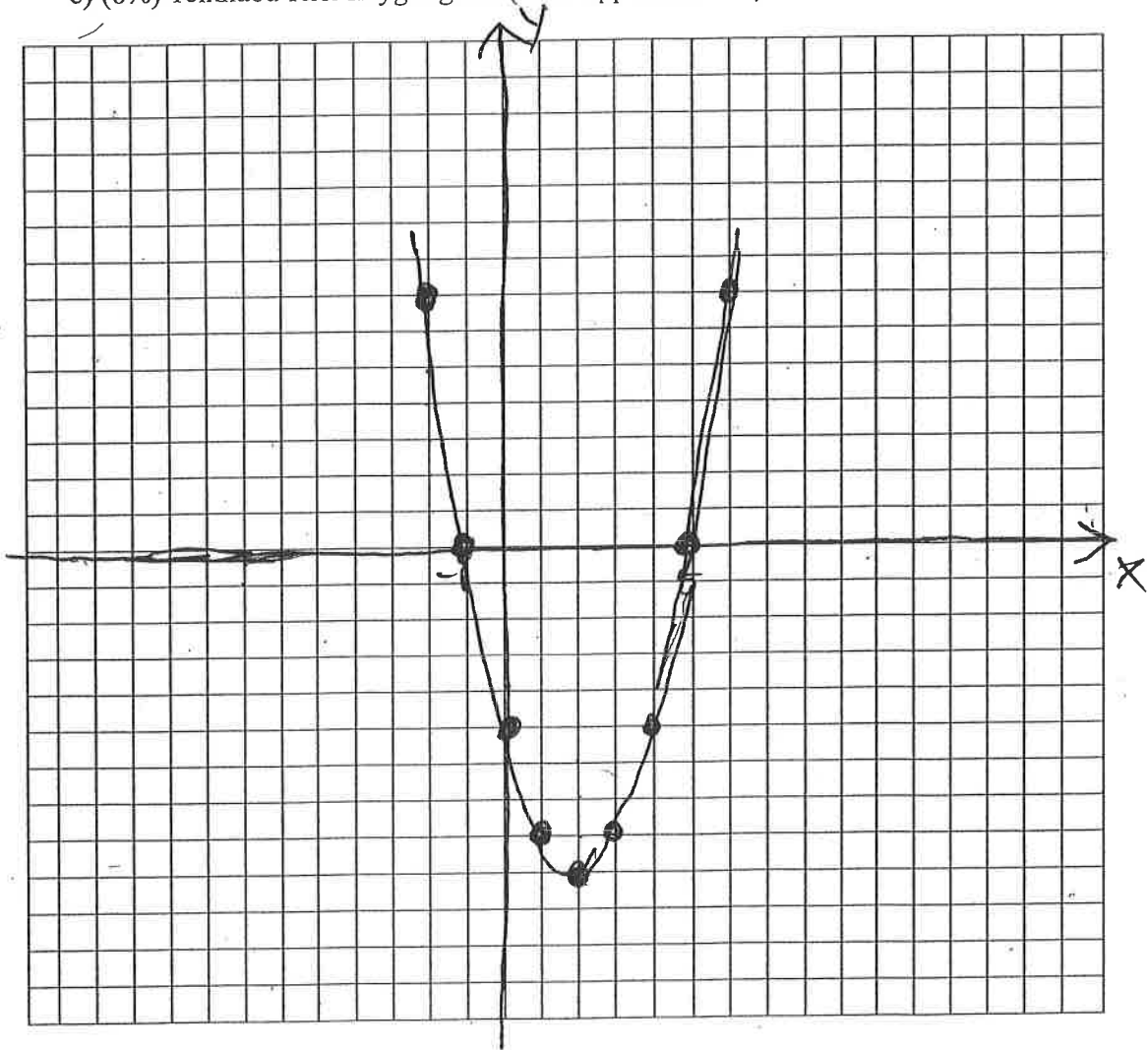
$$D = 36$$

b) (9%) Finndu skurðpunkta ferilsins við ásana og teiknaðu þá inn í hnitakerfið.

$$x_1 = \frac{-(-4) + 6}{2 \cdot 1} = \frac{10}{2} = 5 \quad x_2 = \frac{-(-4) - 6}{2 \cdot 1} = \frac{-2}{2} = -1 \quad (5, 0) \text{ og } (-1, 0)$$

c) (8%) Teiknaðu feril fleygbogans. (settu upp hnitatöflu)

Skurðp. við y ás er  $(0, -5)$



x	$y = x^2 - 4x - 5$
-2	$y = (-2)^2 - 4(-2) - 5 = 4 + 8 - 5 = 7$
-1	$y = 0$
0	$y = -5$
1	$y = 1^2 - 4 \cdot 1 - 5 = 1 - 4 - 5 = -8$
2	$y = -9$
3	$y = 3^2 - 4 \cdot 3 - 5 = 9 - 12 - 5 = -8$
4	$y = 4^2 - 4 \cdot 4 - 5 = 16 - 16 - 5 = -5$
5	$y = 0$
6	$y = 6^2 - 4 \cdot 6 - 5 = 36 - 24 - 5 = 7$

10.

a) (4%) Finndu skilgreiningarmengi og myndmengi fallsins  $f(x) = \sqrt{x-7}$

b) (3%) Finndu  $x$  ef  $f(x) = 2$

$$\begin{aligned}2 &= \sqrt{x-7} \\2^2 &= x-7 \\4+7 &= x \\11 &= x\end{aligned}$$

11.

Gefnar eru margliðurnar:

$$P(x) = x^4 - x^2 - 2x + 17 \text{ og } D(x) = x - 2$$

- a) (1%) Hvert er stig margliðunnar  $D(x)$ ? 4  
b) (2%) Hverjir eru stuðlar margliðunnar  $P(x)$ ? 1, 0, -1, -2, 17  
c) (12%) Deildu margliðunni  $D(x)$  í margliðuna  $P(x)$ .

$$\begin{array}{r}x^3 + 2x^2 + 3x + 4 \\x-2 \overline{) x^4 + 0x^3 - x^2 - 2x + 17} \\ \underline{-x^4 + 2x^3} \phantom{+ 17} \\ 2x^3 - x^2 - 2x + 17 \\ \underline{-2x^3 + 4x^2} \phantom{+ 17} \\ 3x^2 - 2x + 17 \\ \underline{-3x^2 + 6x} \phantom{+ 17} \\ 4x + 17 \\ \underline{-4x + 8} \\ 25\end{array}$$