Laun.

STÆF2TE05 Tímaverkefni 2 (kaflar 7 og 8) Haustönn 2023

Nafn:_____ Einkunn:_____

1. (40%) Leystu 2 stigs jöfnurnar:

a) $x^2 = 1$

$x^2 - 1 = 0$

$A = 1$, $B = 0$, $C = -1$

$D = 0^2 - 4 \cdot 1 \cdot (-1)$

$D = 4$

$x_1 = \frac{-0 + \sqrt{4}}{2 \cdot 1} = \frac{2}{2} = 1$

$x_2 = \frac{-0 - \sqrt{4}}{2 \cdot 1} = \frac{-2}{2} = -1$

b) $x^2 + 6x - 16 = 0$

$A = 1$, $B = 6$, $C = -16$

$D = 6^2 - 4 \cdot 1 \cdot (-16)$

$D = 36 + 64$

$D = 100$

$x_1 = \frac{-6 + \sqrt{100}}{2 \cdot 1} = \frac{-6 + 10}{2} = \frac{4}{2} = 2$

$x_2 = \frac{-6 - \sqrt{100}}{2 \cdot 1} = \frac{-6 - 10}{2} = \frac{-16}{2} = -8$

c) $2x^2 - 5x + 3 = 0$

$A = 2$, $B = -5$, $C = 3$

$D = (-5)^2 - 4 \cdot 2 \cdot 3$

$D = 25 - 24$

$D = 1$

$x_1 = \frac{-(-5) + \sqrt{1}}{2 \cdot 2} = \frac{5 + 1}{4} = \frac{6}{4} = \frac{3}{2}$

$x_2 = \frac{-(-5) - \sqrt{1}}{2 \cdot 2} = \frac{5 - 1}{4} = \frac{4}{4} = 1$

c) $5x^2 = 4x$

$5x^2 - 4x = 0$

$A = 5$, $B = -4$, $C = 0$

$D = (-4)^2 - 4 \cdot 5 \cdot 0$

$D = 16 - 0$

$D = 16$

$x_1 = \frac{-(-4) + \sqrt{16}}{2 \cdot 5} = \frac{8}{10} = \frac{4}{5}$

$x_2 = \frac{-(-4) - \sqrt{16}}{2 \cdot 5} = \frac{4 - 4}{10} = \frac{0}{10} = 0$

2. (10%)
Finndu með hjálp annars stigs jöfnu tvær jákvæðar heilar tölur sem hafa summuna 140 og margfeldið 4371.

$x + y = 140$

$x \cdot y = 4371$

$x = 140 - y$

$(140 - y) \cdot y = 4371$

$140y - y^2 = 4371$

$140y - y^2 - 4371 = 0$

$A = -1$, $B = 140$, $C = -4371$

$D = (140^2 - 4(-1)(-4371))$

$D = 2116$

$x_1 = \frac{-140 + \sqrt{2116}}{2 \cdot (-1)} = \frac{-140 + 46}{-2} = 47$

$x_2 = \frac{-140 - \sqrt{2116}}{2(-1)} = \frac{-140 - 46}{-2} = 93$

3. (50%) Jafna fleygboga er gefin: $y = x^2 - 2x - 3$

$D = (-2)^2 - 4 \cdot 1 \cdot (-3)$
$D = 4 + 12$
$D = 16$

a) (5%) Reiknaðu út jöfnu samhverfuássins.

$A = 1 \quad C = -3$
$B = -2$

$x = \frac{-b}{2A}, \quad x = \frac{-(-2)}{2 \cdot 1} = \frac{2}{2} = 1 \quad x = 1$

b) (10%) Reiknaðu út hnit topppunktsins (botnpunktsins).

$T = \left(\frac{-B}{2A}, \frac{-D}{4A}\right)$ $D = (-2)^2 - 4 \cdot 1 \cdot (-3)$ $T = \left(\frac{-(-2)}{2 \cdot 1}, \frac{-16}{4 \cdot 1}\right) = (1, -4)$
$D = 4 + 12$
$D = 16$

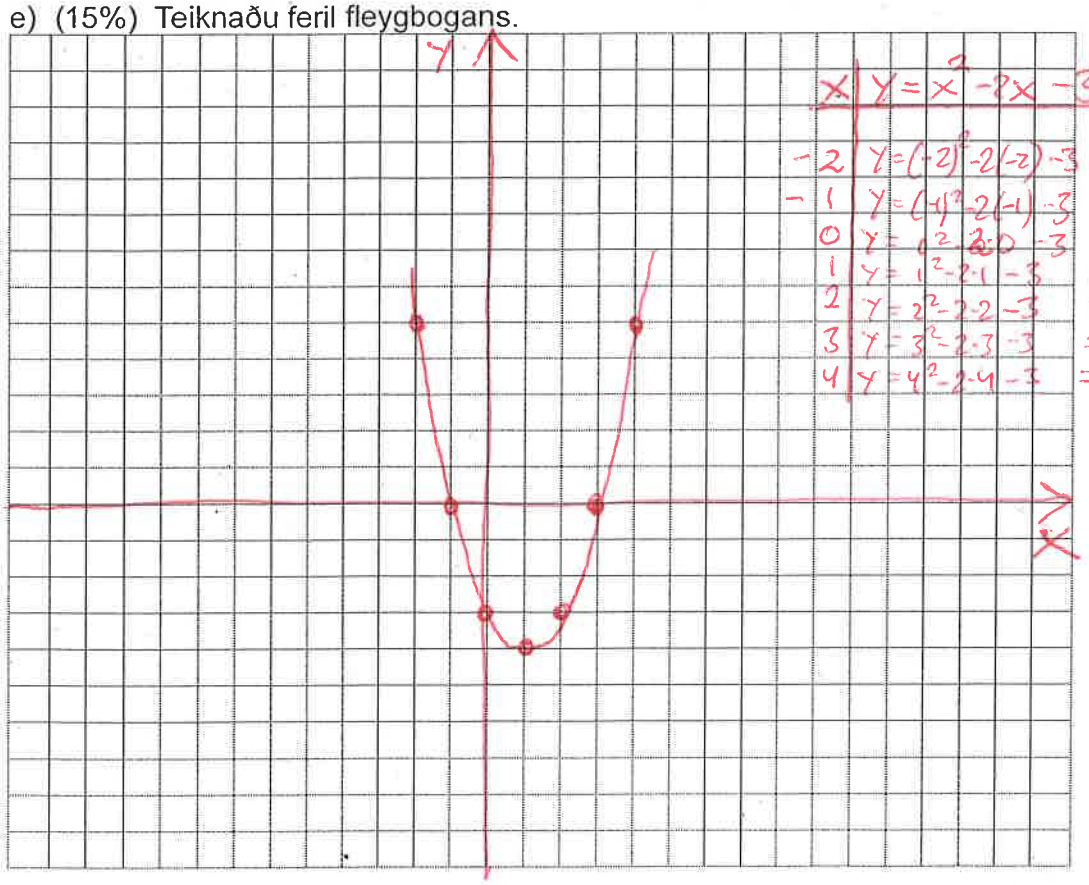
c) (5%) Finndu skurðpunkt ferilsins við y-ás. $(0, C) = (0, -3)$

d) (15%) Reiknaðu út skurðpunkta ferilsins við x-ás og teiknaðu þá inn í hnitakerfið.

$x_1 = \frac{-(-2) + \sqrt{16}}{2 \cdot 1} = \frac{2+4}{2} = \frac{6}{2} = 3 \quad (3, 0)$

$x_2 = \frac{-(-2) - \sqrt{16}}{2 \cdot 1} = \frac{2-4}{2} = \frac{-2}{2} = -1 \quad (-1, 0)$

e) (15%) Teiknaðu feril fleygbogans.



x	$y = x^2 - 2x - 3$	
-2	$y = (-2)^2 - 2(-2) - 3$	$= 5$
-1	$y = (-1)^2 - 2(-1) - 3$	$= 0$
0	$y = 0^2 - 2 \cdot 0 - 3$	$= -3$
1	$y = 1^2 - 2 \cdot 1 - 3$	$= -4$
2	$y = 2^2 - 2 \cdot 2 - 3$	$= -3$
3	$y = 3^2 - 2 \cdot 3 - 3$	$= 0$
4	$y = 4^2 - 2 \cdot 4 - 3$	$= 5$