MORFISME ȘI IZOMORFISME DE GRUPURI

FUNCȚII EXPONENȚIALE, LOGARITMICE

Studiați dacă următoarele funcții sunt izomorfisme de grupuri (legea este scrisă pe rândul fiecărei mulțimi), $f: G_1 \to G_2$:

1) $G_1 = \mathbb{R}$, $x * y = x + y - 3$

$G_2 = \mathbb{R}_+^*$, $x \circ y = x \cdot y$

$f: G_1 \to G_2$, $f(x) = 2^{x-3}$

2) $G_1 = (1, \infty)$, $x * y = xy - x - y + 2$

$G_2 = \mathbb{R}$, $x \circ y = x + y$

$f: G_1 \to G_2$, $f(x) = \ln(x-1)$

3) $G_1 = \mathbb{R}$, $x * y = x + y + 4$

$G_2 = \mathbb{R}_+^*$, $x \circ y = x \cdot y$

$f: G_1 \to G_2$, $f(x) = 5^{x-4}$

4) $G_1 = (3, \infty)$, $x * y = xy - 3x - 3y + 12$

$G_2 = \mathbb{R}$, $x \circ y = x + y$

$f: G_1 \to G_2$, $f(x) = \ln(x-3)$

5) $G_1 = \mathbb{R}$, $x * y = x + y - 5$

$G_2 = \mathbb{R}_+^*$, $x \circ y = xy$

$f: G_1 \to G_2$, $f(x) = e^{x+5}$

6) $G_1 = (-5, \infty)$, $x * y = xy + 5x + 5y + 20$

$G_2 = \mathbb{R}$, $x \circ y = x + y$

$f: G_1 \to G_2$, $f(x) = \ln(x+5)$

7) $G_1 = \mathbb{R}$, $x * y = x + y + 3$

$G_2 = \mathbb{R}_+^*$, $x \circ y = xy$

$f: G_1 \to G_2$, $f(x) = \left(\frac{2}{3}\right)^{x-3}$

8) $G_1 = (-4, \infty)$, $x * y = xy + 4x + 4y + 12$

$G_2 = \mathbb{R}$, $x \circ y = x + y$

$f: G_1 \to G_2$, $f(x) = \ln(x+4)$

9) $G_1 = \mathbb{R}$, $x * y = x + y + 2$

$G_2 = \mathbb{R}_+^*$, $x \circ y = x \cdot y$

$f: G_1 \to G_2$, $f(x) = \left(\frac{2}{5}\right)^{x-2}$

10) $G_1 = (2, \infty)$, $x * y = xy - 2x - 2y + 6$

$G_2 = \mathbb{R}$, $x \circ y = x + y$

$f: G_1 \to G_2$, $f(x) = \ln(x-2)$