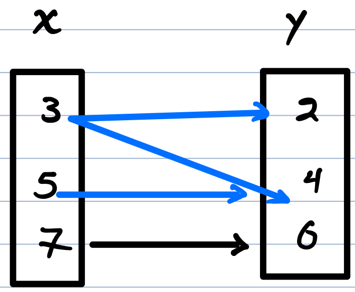
Function

$x \longrightarrow y = f(x)$

input ↲ Domain ↳ output Range.

$\rightarrow \{ (1,2) , (3,5) , (4,7) \}$ Function.

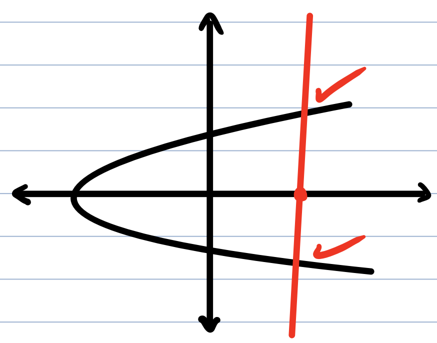
$x = \{1, 3, 4\}$ $y = \{2, 5, 7\}$



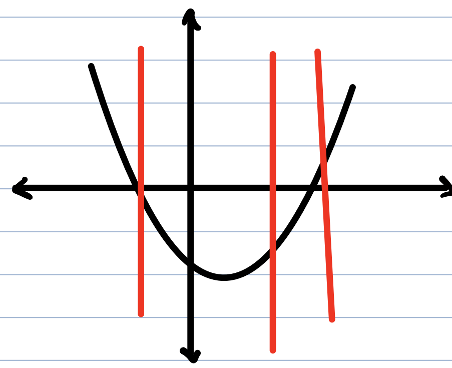
Is that relation function or no?

Not function.

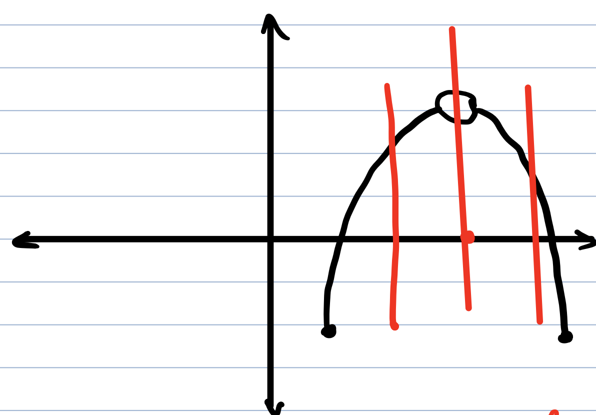
* Vertical Line test:



Not function



Function



Not function.

Evaluate:

$L(x) = 3x + 4$ Find:

1) $L(1) = 3(1) + 4 = 7 \rightarrow (1, 7)$

2) $L(-2) = 3(-2) + 4 = -2 \rightarrow (-2, -2)$

3) $L(2x) = 3(2x) + 4 = 6x + 4$

4) $L(x-1) = 3(x-1) + 4 = 3x - 3 + 4 = 3x + 1$

5) $L(x) + 7 = 3x + 4 + 7 = 3x + 11$

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* Inverse function: $L^{-1}(x)$?

1) $L(x) = y$

2) Replace $x \leftrightarrow y$

3) Find y ?

$L(x) = 7x - 2$ Find $L^{-1}(x)$?

$y = 7x - 2$ ①

$x = 7y - 2$ ②

$x + 2 = 7y \quad \div 7$ ③

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

$L(x) = 5x + 4$ Find $L^{-1}(x)$?

$y = 5x + 4$

$x = 5y + 4$

$x - 4 = 5y$

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

$f(x) = 4x^2 - 3$ Find $f^{-1}(x)$?

$y = 4x^2 - 3$

$x = 4y^2 - 3$

$x + 3 = 4y^2$

$\frac{x+3}{4} = y^2$

$\sqrt{\frac{x+3}{4}} = y$

$f(x) = \frac{4x+7}{3}$ Find $f^{-1}(x)$?

$y = \frac{4x+7}{3}$

$x = \frac{4y+7}{3}$

$3x = 4y + 7$

$3x - 7 = 4y$

$\frac{3x-7}{4} = y$

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* (x, y) —Inverse→ (y, x)
* $f(x) = y$ ⟶ $f^{-1}(y) = x$ ⟵

If $f(x) = \overset{y}{4x - 3}$ Find $f^{-1}(2)$?

$y = 4x - 3$

$x = 4y - 3$

$x + 3 = 4y$

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

$f^{-1}(2) = \frac{2+3}{4} = \frac{5}{4}$

$4x - 3 = 2$

$4x = 5 \rightarrow x = 5/4$

$L(x) = 4x + 7$ Find $L^{-1}(3)$?

$4x + 7 = 3$

$4x = -4 \quad \div 4$

$x = -1$

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* Composite Function :

$L(x) = 5x + 3$ $\quad g(x) = 2x - 1$

→ $L(g(x)) = (Log)(x) = 5(2x - 1) + 3$

$10x - 5 + 3$

$10x - 2$

→ $g(L(x)) = (gOL)(x) = 2(5x + 3) - 1$

$10x + 6 - 1 = 10x + 5$

$L(x) = 4x + 7$ $\quad g(x) = -2x + 5$

Find $L(g(x)) = 4(-2x + 5) + 7$

$-8x + 20 + 7 = -8x + 27$

$g(L(x)) = -2(4x + 7) + 5$

$-8x - 14 + 5$

$-8x - 9$

$L(x) = 4x^2 - 7$ $\quad g(x) = -3x + 4$ ✓

$L(g(1)) = ??$

$g(1) = -3(1) + 4 = 1$

$L(1) = 4(1)^2 - 7 = -3$

$f(x) = 4x + 7$ $\qquad$ $g(x) = 5x - 2$

$g(f(-2))$?

$f(-2) = 4(-2) + 7 = -1$

$g(-1) = 5(-1) - 2 = -7$

If $f(x-2) = 7x + 1$ Find $f(5)$?

$7(7) + 1 = 50$ $\qquad$ $x - 2 = 5$

$x = 7$
