

Linear Relations

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What is a linear relation?

I think of a linear relation as an equation with two variables that can be rearranged into the equation of a line. For example, if we are given the following relation,

$$4x - 3y = 4$$

we can solve for y . What does it mean to solve for y ? When I hear solve for y , I think of this as bringing the y onto one side of the "=" sign and everything else to the other side of the "=" sign and then seeing what y equals. Let's do this together for the relation above.

$$\begin{aligned}4x - 3y &= 4 \\-3y &= 4 - 4x \\y &= -\frac{4}{3} - \frac{4}{-3}x \\&= -\frac{4}{3} + \frac{4}{3}x \\y &= \frac{4}{3}x - \frac{4}{3}\end{aligned}$$

which has the form of the *equation of a line*.

Exercises

1. Determine which relations are linear relations.

a) $6x - 2y - 4$

b) $-x^2 - 2y = 3x + 2$

c) $3x = \frac{1}{y} + 2$

d) $2y - x + 1 = 3y + 2x$

e) $x + 3x^3 + x^2 = y$