



Straight lines

Problem

1. Which of the following describe a straight line?

- a. $4x - 2y = 6$
- b. $y = 2$
- c. The points $(1, 2)$ and $(0, -1)$
- d. $y = 4x$
- e. $y = 2x - 3$
- f. The point $(3, 3)$ and the direction vector $\begin{pmatrix} 1 \\ 2 \end{pmatrix}$
- g. $x = 7y$
- h. The points $(-1, -4)$, $(3, 7)$, and $(8, 8)$
- i. $y - 10 = 3(x + 2)$
- j. The points $\left(\frac{1}{2}, -2\right)$, $(1, -1)$, and $\left(\frac{3}{2}, 0\right)$
- k. $y = x^2 + 2$
- l. $y^2 = x^2$
- m. $0.5x - 7y + 2 = 0$
- n. $xy = 1$
- o. $y^2 - 4xy + 4x^2 = 0$

How did you decide?

- 2. Can you give any other ways to describe a unique straight line?
- 3. Do any of them represent the same line?

Now look just at the versions that **do** describe a unique straight line.

- 4. Pick two of the descriptions. Can you take a line given by one description and express it using the other?
- 5. Why might one description be more useful than another? Can you identify any advantages or disadvantages of any of these representations?

Relevance

E2

How is the solution of equations related to problems in geometry?

G2

What is the connection between algebra and geometry, and how can we exploit it?