

# Linear Functions

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Concepts

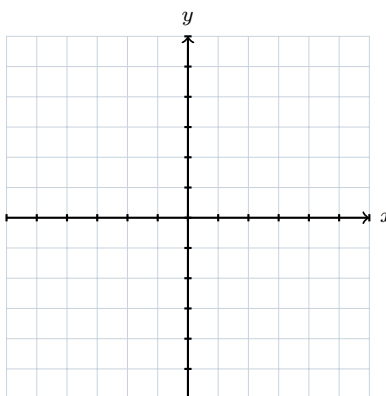
- Finding the Equation of a Linear Function
- Graphing a Linear Function
- The Inverse of the Linear Function
- The Properties of a Linear Function
- The Rate of Change (a) and the y-Intercept (b)
- The Role of Parameters in a Linear Function (theory)

## Finding the Equation of a Linear Function

1. A survey drone climbs at a constant rate. Four seconds after take-off it is at an altitude of 27 m, and ten seconds after take-off it is at 51 m. Find the rule giving the altitude  $h$  (in metres) as a function of the time  $t$  (in seconds), and state the altitude of the launch platform.

## Graphing a Linear Function

2. Sketch the graph of  $f(x) = -\frac{3}{4}x + 3$  on the grid below. State its  $x$ -intercept, its  $y$ -intercept, and the interval over which  $f(x) \geq 0$ .



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**The Inverse of the Linear Function**

**3.** Let  $f(x) = -\frac{3}{4}x + 6$ . Find the rule of  $f^{-1}$  and verify your answer with the point of the graph of  $f$  whose abscissa is 8.

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**The Properties of a Linear Function**

**4.** An 18 L pail of primer covers  $\frac{4}{3}$  m<sup>2</sup> per litre. The volume of primer left after painting  $x$  square metres of wall is  $f(x) = -\frac{3}{4}x + 18$ .

- a) State the rate of change and the initial value of  $f$ , with their units.
- b) Find the zero of  $f$  and explain what it represents.
- c) Give the domain and the range of  $f$  in this context.

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**The Rate of Change (a) and the y-Intercept (b)**

**5.** A delivery drone descends at a constant rate. Its altitude is 94 m after 2 s and 64 m after 7 s.

- a) Find the rate of change and the initial value.
- b) Write the rule  $A(t)$  giving the altitude after  $t$  seconds.
- c) After how many seconds is the drone at 40 m?

**The Role of Parameters in a Linear Function**

6. Two students describe the graph of  $f(x) = ax + b$ .

a) Alex: “Increasing  $b$  makes the line steeper.”

b) Bao: “Replacing  $a$  by  $-a$  reflects the graph in the  $y$ -axis.”

Decide whether each statement is true or false. Correct any false statement and justify your answers with the role of the parameters.

**Want the harder problems and the worked solutions?**

The *Challenge Problems* set and the *Answer Keys* for Linear Functions — with the reasoning written out in full — are available at [tutorinmontreal.ca](https://tutorinmontreal.ca).