

Linguistic Mapping

# The Principles of Calculus I

I

Decomposition

I.4

Functions given by Simple Formulas

Classroom Exercises

Copyright © 2024 by Bryan Carrillo and David Weisbart.

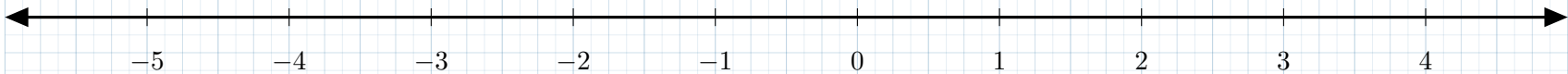
All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from Bryan Carrillo and David Weisbart.

## Exercise 1

Take  $f$  to be the function that is given by the formula

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

Sketch the domain of  $f$  on a real number line.



## Exercise 2

Take  $f$  to be the function that is given by the formula

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

Determine real numbers  $a$  and  $b$  so that the points  $(1, a)$  and  $(2, b)$  are in  $f$ .

## Exercise 3

Take  $f$  to be the function that is given by the formula

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

Evaluate  $f$  at 1 and 2.

## Exercise 4

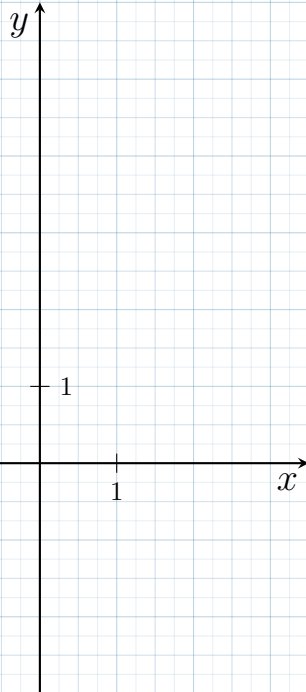
Take  $f$  to be the function that is given by the formula

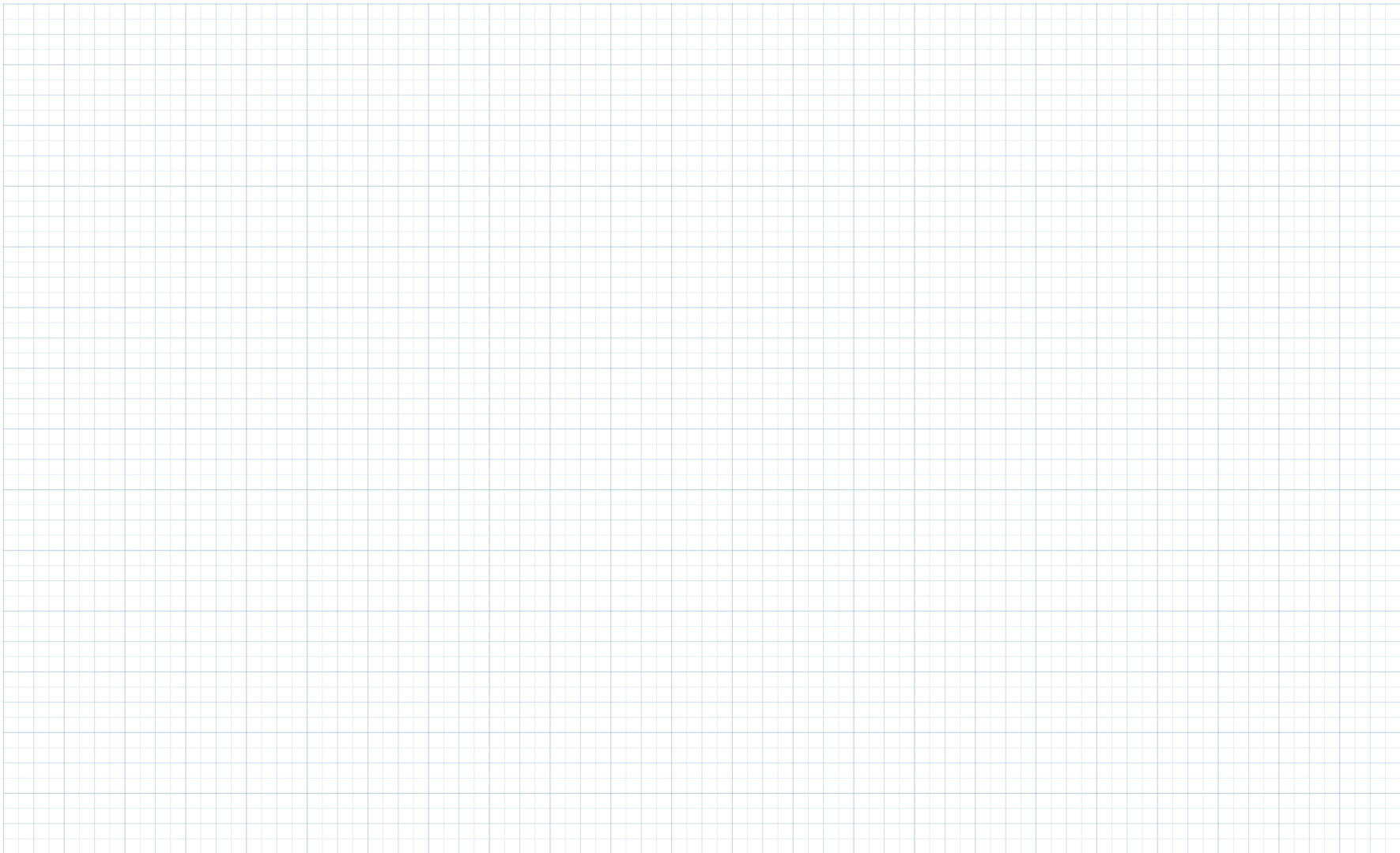
$$f(x) = \frac{(x + 2)(x - 1)(x - 4)}{(x + 5)(x - 3)(x - 4)}.$$

Determine  $f(1)$  and  $f(2)$ .

## Exercise 5

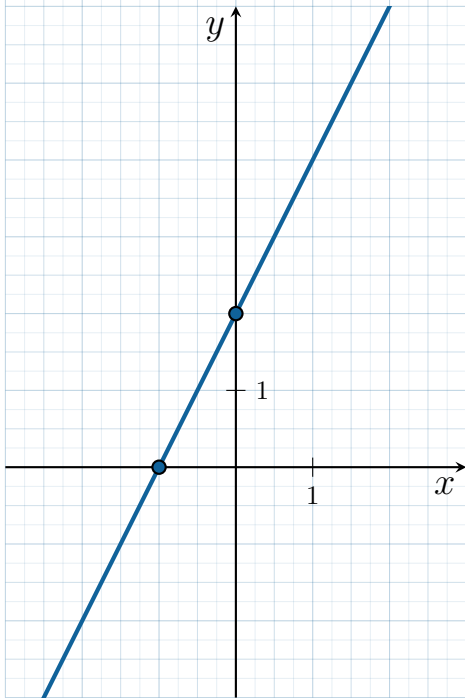
Use similar triangles to determine an equation for the line that passes through the points  $(-1, -2)$  and  $(2, 4)$ . Sketch this line and then use set builder notation to describe the line as a function (a subset of  $\mathbb{R}^2$ ).





## Exercise 6

Identify the  $x$ -intercept and  $y$ -intercept of this line:





## Exercise 7

A line  $L$  has  $x$ -intercept equal to 2 and a  $y$ -intercept equal to 5. Determine an equation for the line.

## Exercise 8

A line  $L_1$  has an  $x$ -intercept equal to  $-2$  and line  $L_2$  has an  $x$ -intercept equal to  $3$ .

- (a) Determine all possible  $y$ -intercepts for  $L_1$  so that the slope of  $L_1$  is positive.
- (b) Determine all possible  $y$ -intercepts for  $L_2$  so that the slope of  $L_2$  is positive.

