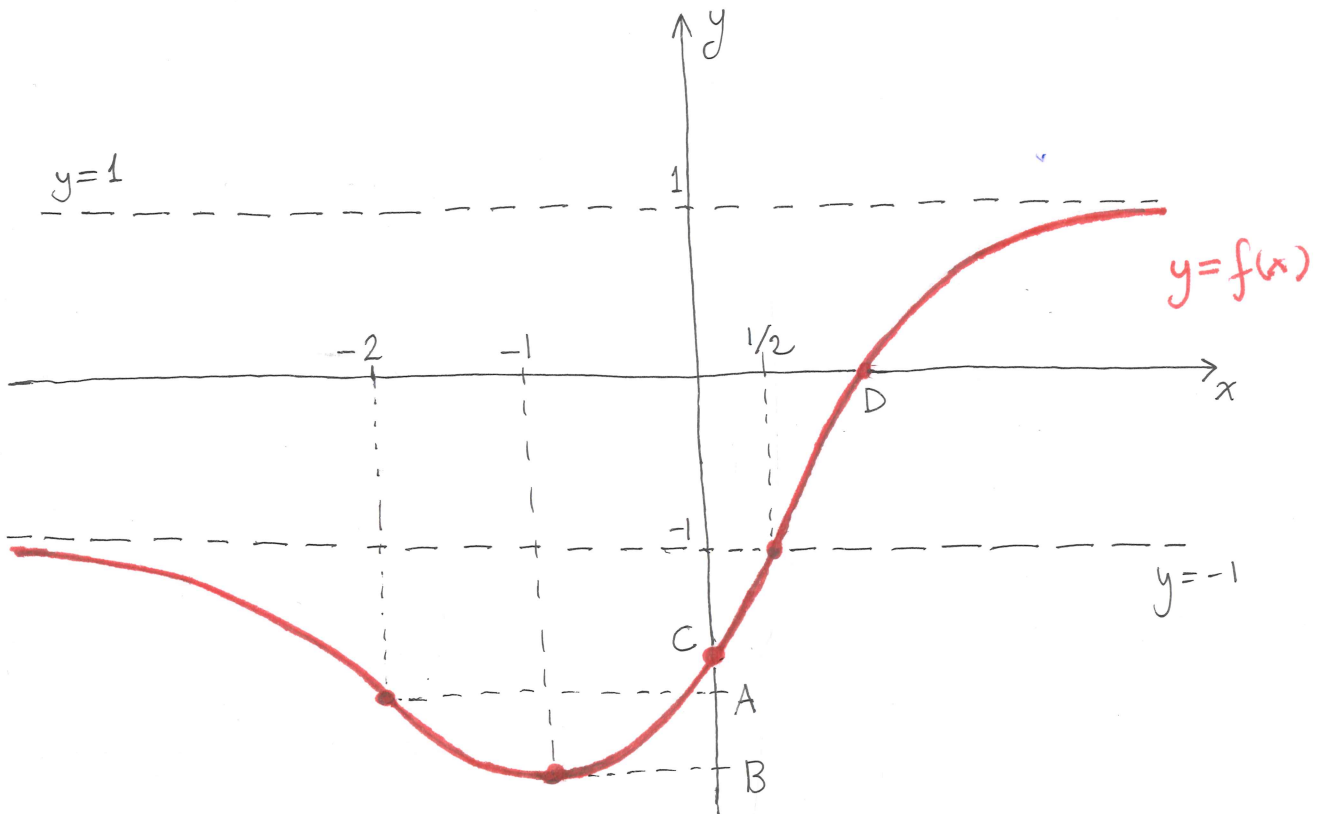


1. A twice-differentiable function  $f$  on  $(-\infty, \infty)$  satisfies the following conditions:

- ①  $f(-2) = A$ ,  $f(-1) = B$ ,  $f(0) = C$ ,  $f(1/2) = -1$ ,  $f(D) = 0$  where  $A < C$
- ②  $\lim_{x \rightarrow -\infty} f(x) = -1$ ,  $\lim_{x \rightarrow \infty} f(x) = 1$
- ③  $f'(x) < 0$  for  $x < -1$ ,  $f'(x) > 0$  for  $x > -1$ ,
- ④  $f''(x) < 0$  for  $x < -2$  and for  $x > 1/2$ ,  $f''(x) > 0$  for  $-2 < x < 1/2$ .

a. Sketch the graph of  $y = f(x)$ . Make sure to clearly show all important features.



b. Fill in the boxes to make the following a true statement.

The function  $f(x) = \frac{ax + b}{\sqrt{x^2 + c}}$  satisfies the conditions ①-④ for suitable real numbers  $A, B, C, D$  if

the constants  $a, b$  and  $c$  are chosen as

$$a = \boxed{1}, \quad b = \boxed{-2} \quad \text{and} \quad c = \boxed{2}.$$