

Section 4.2

#8, p. 292. Find all numbers c that satisfy the conditions of Rolle's theorem for the function

$f(x) = x + \frac{1}{x}$ on the interval $\left[\frac{1}{2}, 2\right]$.

> $f := x \rightarrow x + \frac{1}{x}$

$$f := x \rightarrow x + \frac{1}{x} \quad (1)$$

> $f(x)$

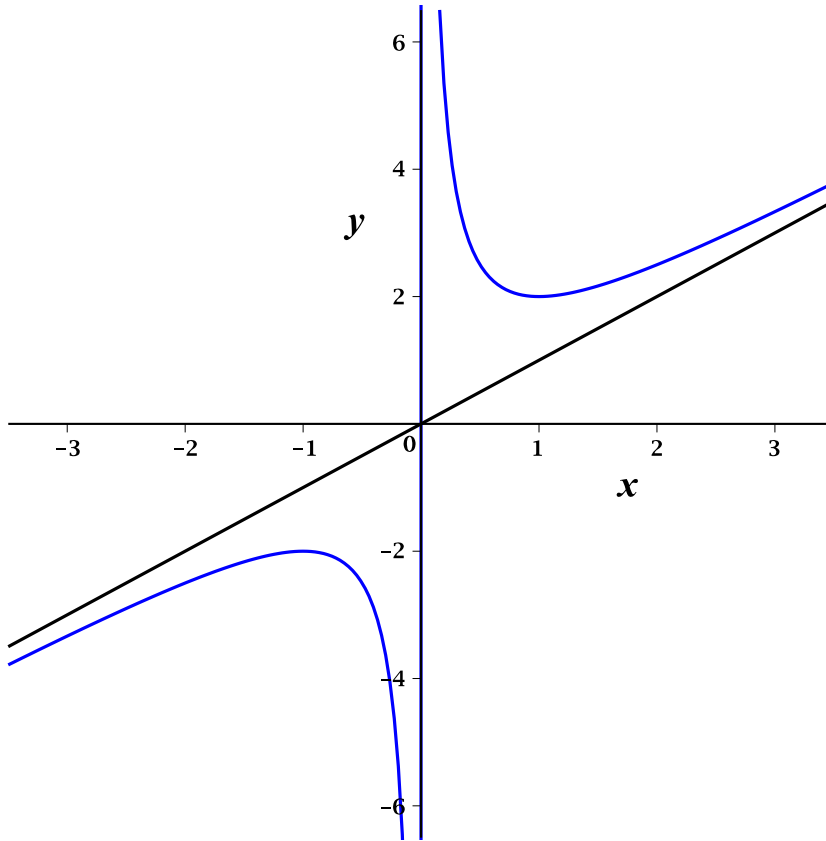
$$x + \frac{1}{x} \quad (2)$$

> $f(1), f(2)$

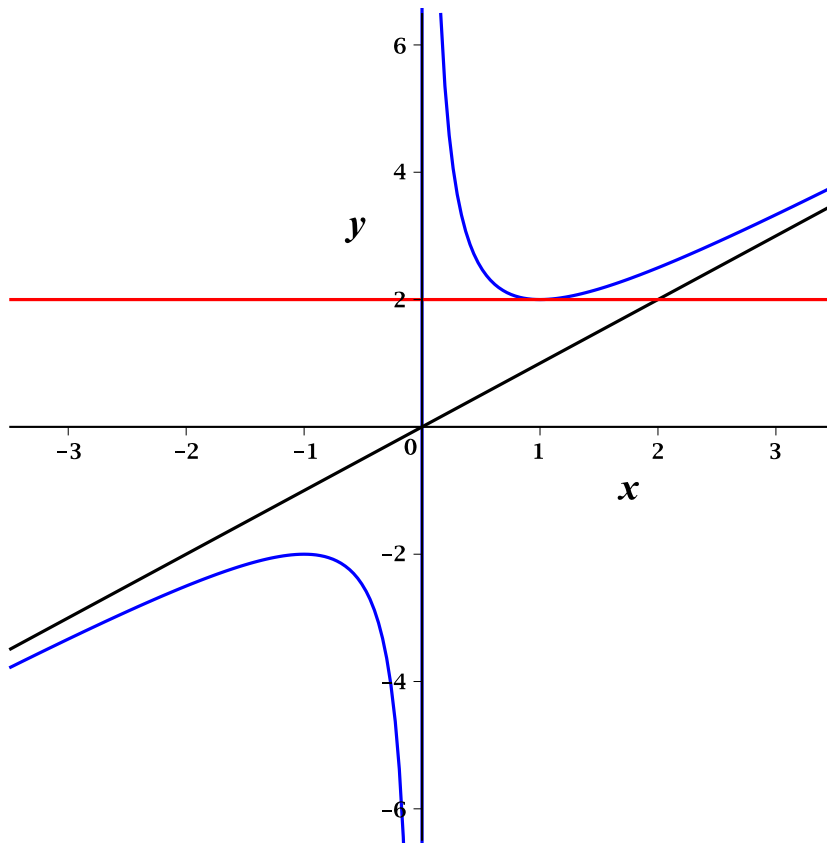
$$2, \frac{5}{2} \quad (3)$$

Solution.

> `plot([f(x), x], x=-3.5..3.5, y=-6.5..6.5, tickmarks = ([spacing(1), spacing(2)]),
thickness=1, font=[Times, bold, 8], labelfont=[Roman, bold, 14], color=[blue,
black])`

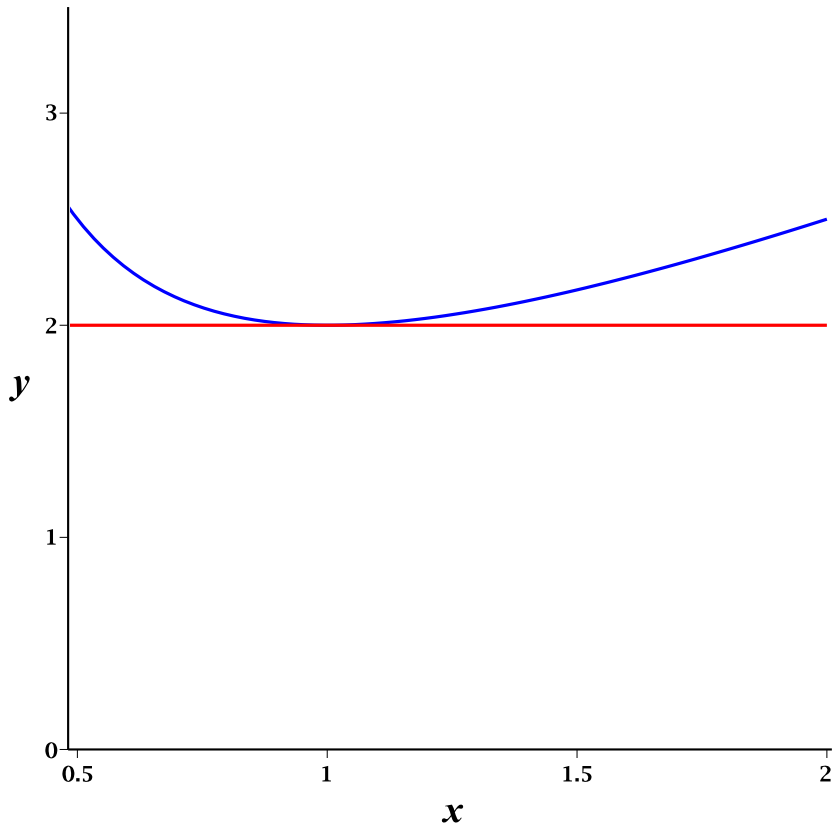


```
> plot([f(x), x, 2], x=-3.5..3.5, y=-6.5..6.5, tickmarks = ([spacing(1), spacing(2)]),  
      thickness=1, font=[Times, bold, 8], labelfont=[Roman, bold, 14], color=[blue,  
      black, red])
```



```
>
```

```
> plot([f(x), 2], x=-2..2, y=-5..5, tickmarks = ([spacing(0.5), spacing(1)]), thickness = 1, font = [Times, bold, 8], labelfont = [Roman, bold, 14], color = [blue, red], view = [0.49..2.01, 0..3.5])
```



```
>
```

#12, p. 292. Find all numbers c that satisfy the conditions of the Mean Value Theorem for the function $f(x) = x^3 - 3x + 2$ on the interval $[-2, 2]$.

> $f := x \rightarrow x^3 - 3x + 2$

>

$$f := x \rightarrow x^3 - 3x + 2 \quad (4)$$

> $f(x)$

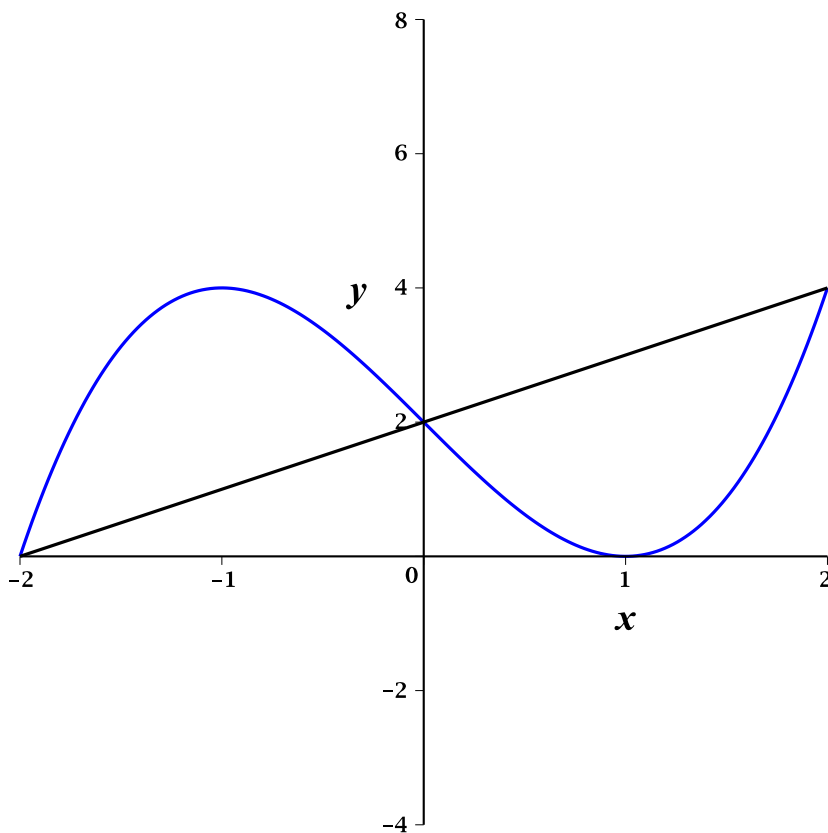
$$x^3 - 3x + 2 \quad (5)$$

> $f(-2), f(0), f(2)$

$$0, 2, 4 \quad (6)$$

Solution.

> $plot([f(x), x + 2], x = -2.0 .. 2.0, y = -4.0 .. 8.0, tickmarks = ([spacing(1), spacing(2)]), thickness = 1, font = [Times, bold, 8], labelfont = [Roman, bold, 14], color = [blue, black, red, red])$



$$> f\left(\frac{2}{\sqrt{3}}\right), f\left(-\frac{2}{\sqrt{3}}\right)$$

$$-\frac{10}{9}\sqrt{3} + 2, \frac{10}{9}\sqrt{3} + 2$$

(7)

$$> \text{plot}\left(\left[f(x), x + 2, x + 2 - \frac{16\cdot\sqrt{3}}{9}, x + 2 + \frac{16\cdot\sqrt{3}}{9}\right], x = -2.0..2.0, y = -4.0..8.0,$$

tickmarks = ([spacing(1), spacing(2)]), thickness = 1, font = [Times, bold, 8],

labelfont = [Roman, bold, 14], color = [blue, black, red, red])

