

$$p := x \mapsto x^4 - x^3 - 8$$

$$p := x \mapsto x^4 - x^3 - 8 \quad (1)$$

`solve(p(x)=0)`

$$2, -\frac{(46 + 3\sqrt{249})^{1/3}}{3} + \frac{5}{3(46 + 3\sqrt{249})^{1/3}} - \frac{1}{3}, \frac{(46 + 3\sqrt{249})^{1/3}}{6} \quad (2)$$

$$-\frac{5}{6(46 + 3\sqrt{249})^{1/3}} - \frac{1}{3}$$

$$+ \frac{I\sqrt{3} \left(-\frac{(46 + 3\sqrt{249})^{1/3}}{3} - \frac{5}{3(46 + 3\sqrt{249})^{1/3}} \right)}{2}, \frac{(46 + 3\sqrt{249})^{1/3}}{6}$$

$$-\frac{5}{6(46 + 3\sqrt{249})^{1/3}} - \frac{1}{3}$$

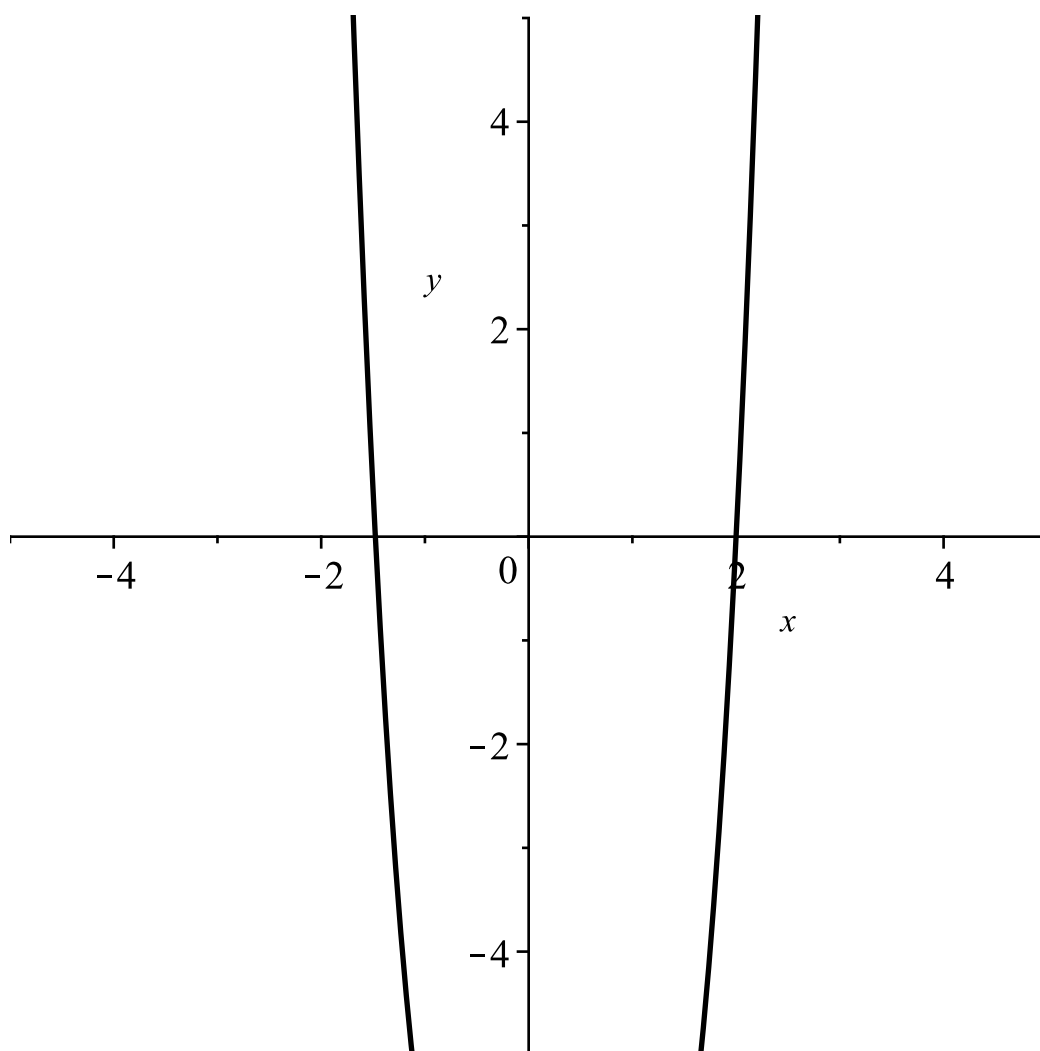
$$-\frac{I\sqrt{3} \left(-\frac{(46 + 3\sqrt{249})^{1/3}}{3} - \frac{5}{3(46 + 3\sqrt{249})^{1/3}} \right)}{2}$$

`evalf(%)`

$$2., -1.477967242, 0.2389836218 - 1.627669118 I, 0.2389836218 + 1.627669118 I \quad (3)$$

`with(plots) :`

`plot(p(x), x=-5..5, y=-5..5, color=black, thickness=2)`



$$p(2) \qquad \qquad \qquad 0 \qquad \qquad \qquad (4)$$

$$p\left(\frac{3}{2}\right) \qquad \qquad \qquad -\frac{101}{16} \qquad \qquad \qquad (5)$$

$$q := x \mapsto x^2 - x - 6 \qquad \qquad \qquad q := x \mapsto x^2 - x - 6 \qquad \qquad \qquad (6)$$

$$f := x \mapsto \frac{p(x)}{q(x)} \qquad \qquad \qquad f := x \mapsto \frac{p(x)}{q(x)} \qquad \qquad \qquad (7)$$

$$f(x) \qquad \qquad \qquad \frac{x^4 - x^3 - 8}{x^2 - x - 6} \qquad \qquad \qquad (8)$$

$$fp := D(f)$$

$$fp := x \mapsto \frac{4x^3 - 3x^2}{q(x)} - \frac{p(x)(2x-1)}{q(x)^2} \quad (9)$$

fp(x)

$$\frac{4x^3 - 3x^2}{x^2 - x - 6} - \frac{(x^4 - x^3 - 8)(2x - 1)}{(x^2 - x - 6)^2} \quad (10)$$

simplify(%)

$$\frac{2x^5 - 4x^4 - 22x^3 + 18x^2 + 16x - 8}{(x^2 - x - 6)^2} \quad (11)$$

solve(fp(x)=0)

$$\text{RootOf}(_Z^5 - 2_Z^4 - 11_Z^3 + 9_Z^2 + 8_Z - 4, \text{index}=1), \text{RootOf}(_Z^5 - 2_Z^4 - 11_Z^3 + 9_Z^2 + 8_Z - 4, \text{index}=2), \text{RootOf}(_Z^5 - 2_Z^4 - 11_Z^3 + 9_Z^2 + 8_Z - 4, \text{index}=3), \text{RootOf}(_Z^5 - 2_Z^4 - 11_Z^3 + 9_Z^2 + 8_Z - 4, \text{index}=4), \text{RootOf}(_Z^5 - 2_Z^4 - 11_Z^3 + 9_Z^2 + 8_Z - 4, \text{index}=5) \quad (12)$$

evalf(%)

$$0.4110790456, 1.082024449, 4.058901063, -0.8071908715, -2.744813686 \quad (13)$$