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Opgave 253

$$P1(10, 235)$$

$$P2(1, 3)$$

$$P3(0, -5)$$

$$y = ax^2 + bx + c$$

Opstiller 3 formler

$$235 = a \cdot 10^2 + b \cdot 10 + c$$

$$3 = a \cdot 1^2 + b \cdot 1 + c$$

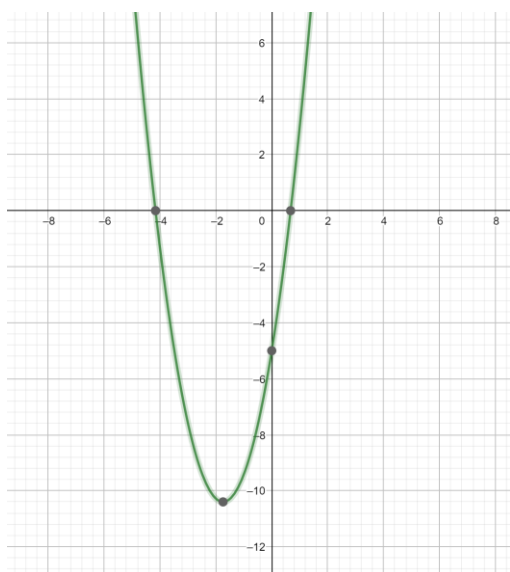
$$-5 = a \cdot 0^2 + b \cdot 0 + c$$



The system of equations is solved for a,b,c by WordMat's 'solve equation' function,

$$a = 1,777778 \quad \wedge \quad b = 6,222222 \quad \wedge \quad c = -5$$

$$f(x) = 1.78x^2 + 6.2x - 5$$



Isoler funktionen så alt står på venstre side

$$f(x) = 1.78x^2 + 6.2x - 5 = \frac{1}{2}x + 1$$

$$f(x) = 1.78x^2 + 6.2x - 5 - 1 = \frac{1}{2}x$$

$$f(x) = 3.56x^2 + 12.4x - 12 = x$$

$$f(x) = 3.56x^2 + 12.4x - 12 - x = 0$$

$$f(x) = 3.56x^2 + 11.4x - 12 = 0$$

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Skriver alle komponenterne op

$$a = 3.54$$

$$b = 11.4$$

$$c = -12$$

Udregner diskriminantnen

$$d = b^2 - 4ac$$

$$d = 11.4^2 - 4 \cdot 3.54 \cdot (-12)$$

$$d = 30$$

Formel for løsninger

$$x_{1,2} = \frac{-b \pm \sqrt{d}}{2a}$$

Løsning 1

$$x_1 = \frac{-b + \sqrt{d}}{2a}$$

$$x_1 = \frac{-11.4 + \sqrt{300}}{2 \cdot 3.54}$$

$$x_1 = 0,83623$$

Løsning 2

$$x_2 = \frac{-b - \sqrt{d}}{2a}$$

$$x_2 = \frac{-11.4 - \sqrt{300}}{2 \cdot 3.54}$$

$$x_2 = -4,056569$$

Find y koordinatet til de to skæringspunkter

$$y_1 = ax_1^2 + bx_1 + c$$

$$y_1 = 1.78 \cdot 0.84^2 + 6.2 \cdot 0.84 - 5$$

$$y_1 = 1,463968$$

$$S_1(0.84; 1.46)$$

$$y_2 = ax_2^2 + bx_2 + c$$

$$y_2 = 1.78 \cdot (-4.1)^2 + 6.2 \cdot (-4.1) - 5$$

$$y_2 = -0,4982$$

$$S_2(-4.1; -0.498)$$