For the line $y = \frac{-1}{2}x + 6.5$.
The $y - intercept$ is when $x = 0$ therefore $y = 6.5$.
The $x - intercept$ is when $y = 0$ therefore $x = 13$.
For the curve $y = x^2 + 6x - 4$; The solutions are $3 \pm \sqrt{13}$.
The $y - intercept$ is when $x = 0$ therefore $y = -4$.
The turning point;

$$y = x^2 - 6x - 4$$

$$\frac{dy}{dx} = 2x - 6$$

$$2x - 6 = 0$$

$$2x = 6$$

$$x = 3$$

Substituting this back into the equation;

$$y = 3^2 - 6(3) - 4$$

$$y = -13$$

Therefore $(3, -13)$

And the two curves meet at;

$$\frac{-1}{2}x + 6.5 = x^2 - 6x - 4$$

$$\frac{-1}{2}x = x^2 - 6x - \frac{21}{2}$$

$$0 = x^2 - 5.5x - \frac{21}{2}$$

$$= 2x^2 - 11x - 21$$

$$= (2x + 3)(x - 7)$$

the x-coordinates are $x = \frac{-3}{2}$ and $x = 7$

Substituting these back into our equation of the line;

$$y = \frac{-1}{2}(\frac{-3}{2}) + 6.5$$

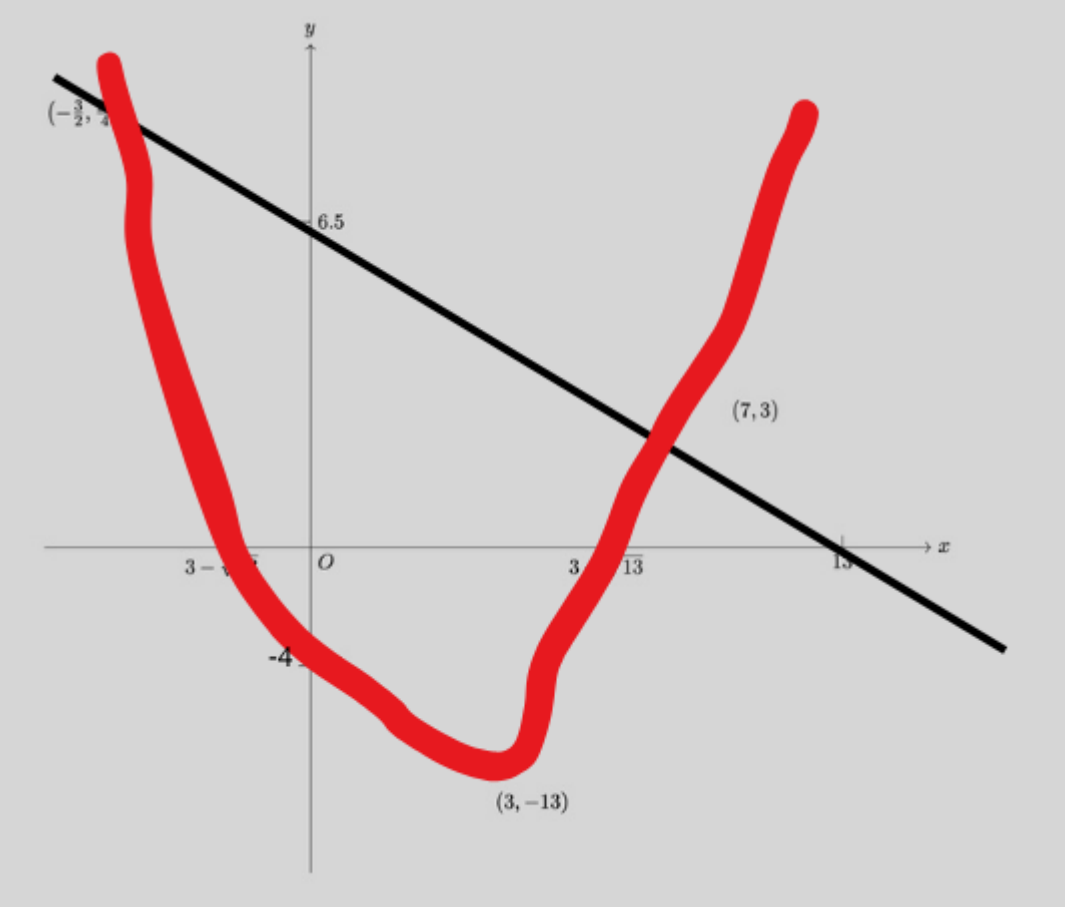
$$= \frac{29}{4}$$

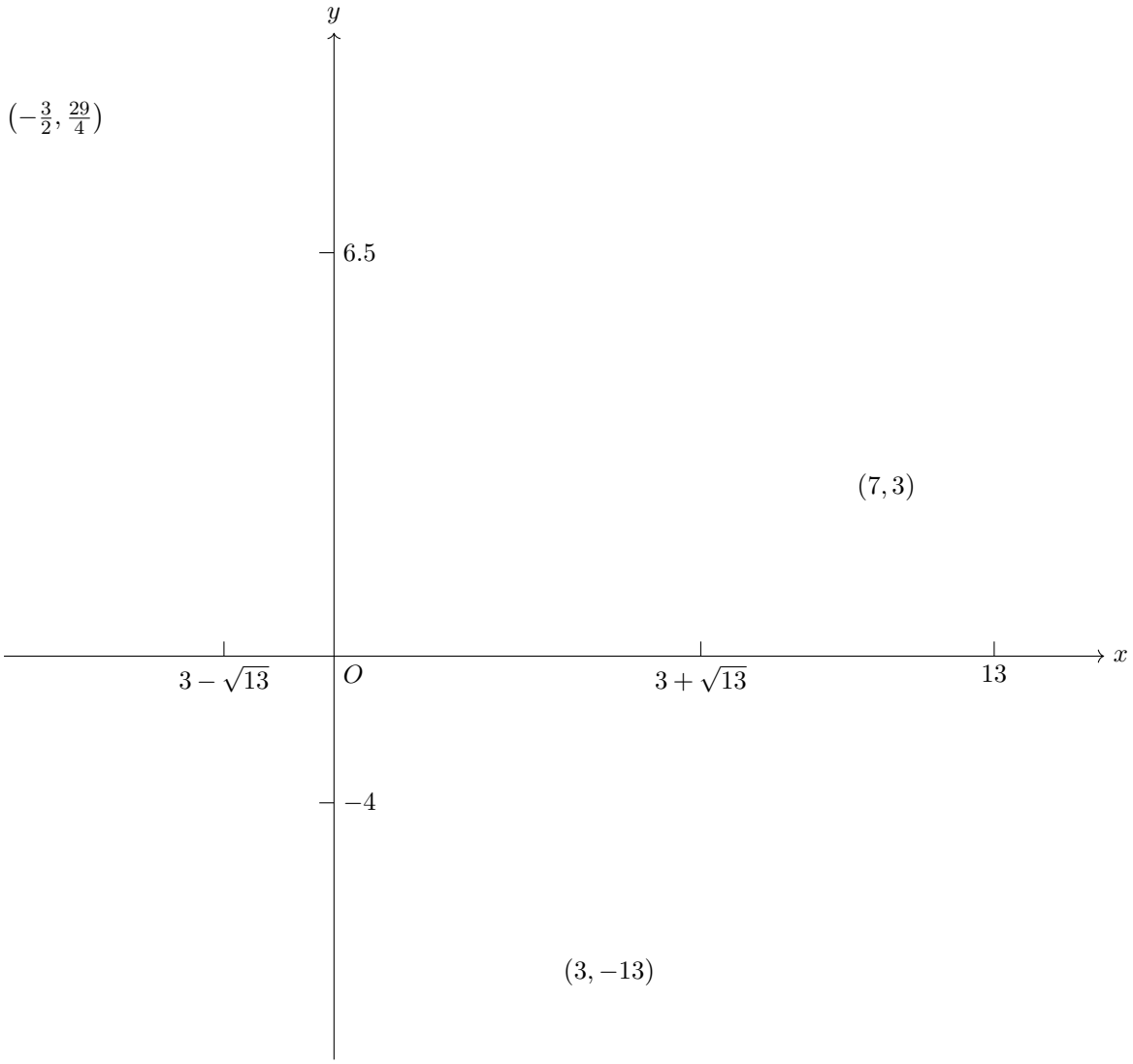
and

$$y = \frac{-1}{2}(7) + 6.5$$

$$= 3$$

therefore the curves meet at $(\frac{-3}{2}, \frac{29}{4})$ and $(7, 3)$.




y
$\left(-\frac{3}{2}, \frac{29}{4}\right)$
6.5
(7, 3)
x
$3-\sqrt{13}$
O
$3+\sqrt{13}$
13
−4
(3, −13)