Question

Find the values of x where the line $y = -2x + 20$ intersects the

$y = 2x^2 + 3x - 22$.

Solution

If the line

$$y = -2x + 20$$

intersects the

$$y = 2x^2 + 3x - 22;$$

then

$$-2x + 20 = 2x^2 + 3x - 22;$$

$$2x^2 + 3x - 22 + 2x - 20 = 0;$$

$$2x^2 + 5x - 42 = 0;$$

$$a = 2, \ b = 5, \ c = -42;$$

$$D = b^2 - 4ac;$$

$$D = 25 + 4 * 2 * 42 = 361; \ \sqrt{D} = 19;$$

$$x_1 = \frac{-b - \sqrt{D}}{2a} = \frac{-5 - 19}{4} = 6;$$

$$x_2 = \frac{-b + \sqrt{D}}{2a} = \frac{-5 + 19}{4} = 3.5;$$

So,

$$y_1 = -2x_1 + 20 = -2 \cdot 6 + 20 = 8;$$

$$y_2 = -2x_2 + 20 = -2 \cdot 3.5 + 20 = 13.$$

There are two points of intersection: $(6, 8)$ and $(3.5, 13)$.

Answer: $(6, 8), (3.5, 13)$.