
1(4 pts). Find an equation of the line passing through the points $(1, 4)$ and $(3, -3)$.

2a(3 pts). Factor the polynomial $x^2 + 11x - 26$.

2b(3 pts). Find all solutions to the equation $2x^2 + 7x = 26 - 4x + x^2$.

Solution:

1.(Source: 0.5) The slope of the line is $\frac{\Delta y}{\Delta x} = \frac{-3-4}{3-1} = -\frac{7}{2}$. The line can be expressed in point-slope form as

$$y - 4 = -\frac{7}{2}(x - 1).$$

$y + 3 = -\frac{7}{2}(x - 3)$ and $y = -\frac{7}{2}x + \frac{15}{2}$ are also correct.

2a.(Source: 0.4) $x^2 + 11x - 26 = (x - 2)(x + 13)$.

2b.(Source: 0.7) Add and subtract terms to get zero on one side. Then collect like terms and factor.

$$2x^2 - x^2 + 7x + 4x - 26 = 0$$

$$x^2 + 11x - 26 = 0$$

$$(x - 2)(x + 13) = 0$$

A product of two numbers equals zero if and only if one or the other is zero:

$$\begin{array}{ccc} x - 2 = 0 & & x + 13 = 0 \\ x = 2 & \text{or} & x = -13 \end{array}$$

The solutions to the original equation are $x = 2$ and $x = -13$.