$$\frac{x+3}{x-1} + \frac{2(x+1)}{x+1} = \frac{8}{x^2-1}$$

$$\frac{(x+3)(x+1)}{(x-1)(x+1)} + \frac{2(x+1)(x-1)}{(x+1)(x-1)} = \frac{8}{x^2-1} \qquad x \neq 1,\ x \neq -1$$

$$\frac{(x+3)(x+1)}{x^2-1} + \frac{2(x+1)(x-1)}{x^2-1} = \frac{8}{x^2-1}$$

$$x^2 + 4x + 3 + 2x^2 - 2 = 8$$

$$3x^2 + 4x - 8 = 0$$

$$D = 16 - 4 \cdot 3 \cdot (-8) = 16 + 96 = 112$$

$$x_1 = \frac{-b + \sqrt{D}}{2a} = \frac{-4+5}{6} = \frac{1}{6}$$

$$x_2 = \frac{-b - \sqrt{D}}{2a} = \frac{-4-5}{6} = -\frac{3}{2}$$