Checking solution: $x^2 - bx - ax = \emptyset$ so

$a = 1$

$b = -(b+a)$

$c = \emptyset$

$$\frac{(b+a) \pm \sqrt{(b+a)^2 - 4(\emptyset)}}{2}$$

$$\Downarrow$$

$$\frac{(b+a) \pm (b+a)}{2} = \left\{ \begin{matrix} 0, \\ (b+a) \end{matrix} \right\}$$

soln: $x = (b+a)$

solution check below $\longrightarrow$ $\boxed{x^2 + x(-b-a) = \emptyset}$

$$x^2 - x(b+a) = \emptyset$$

$$(b+a)^2 - (b+a)(b+a) = \emptyset \longleftarrow \text{check for quadratic}$$

Problem

$$\left(\frac{x-a}{b}\right) + \left(\frac{x-b}{a}\right) = \frac{b}{(x-a)} + \frac{a}{(x-b)}$$

Sub $x = (b+a)$ to check the solution.

$$\frac{(b+a)-a}{b} + \frac{(b+a)-b}{a} = \frac{b}{(b+a)-a} + \frac{a}{(b+a)-b}$$

$$\left\{ \frac{b}{b} + \frac{a}{a} = \frac{b}{b} + \frac{a}{a} \right\} = \{2 = 2\}$$

solution checks.

Problem #226 Mathematical Quickies - Charles W. Trigg

Solve the equation: $(x-a)/b + (x-b)/a = b/(x-a) + a/(x-b)$

Avoid the mess and substitute $c = (x-a)$, and $d = (x-b)$ then solve $\xleftarrow{} cd = ab \xrightarrow{}$

Now problem is to solve: $\frac{c}{b} + \frac{d}{a} = \frac{b}{c} + \frac{a}{d}$

$$\left[\frac{ac + bd}{ab} = \frac{db + ac}{cd} \right] \text{ re ordered } \left[\frac{ac+bd}{ab} = \frac{ac+bd}{cd} \right]$$

So we simplify: $\left[\cancel{\frac{ac + bd}{ac + bd}}\ 1 = \frac{ab}{cd} \right] = \left[1 = \frac{ab}{cd} \right]$

expand our original substitution: $\left[1 = \frac{ab}{(x-a)(x-b)} \right] \Rightarrow x^2 - bx - ax + \cancel{ab} = \cancel{ab}$

$$\boxed{x^2 - bx - ax = \emptyset}$$

$$\boxed{x^2 - x(b+a) = \emptyset} \longrightarrow \text{see soln check!}$$