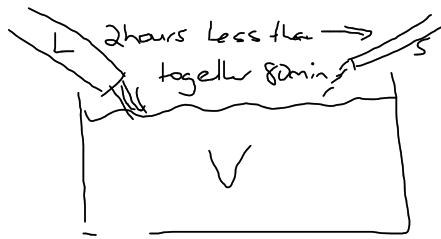


11g)



$$S = \frac{V}{t}$$

$$S_L = \frac{V}{x}$$

$$S_S = \frac{V}{x+120}$$

$$S_T = \frac{V}{80}$$

$$\frac{V}{80} = \frac{V}{x} + \frac{V}{x+120}$$

$$\frac{1}{80} = \frac{1}{x} + \frac{1}{x+120}$$

$$\frac{1}{80} = \frac{2x+120}{x(x+120)}$$

$$\frac{1}{160} = \frac{x+60}{x(x+120)}$$

$$x^2 + 120x = 160x + 9600$$

$$x^2 - 40x - 9600 = 0$$

$$(x - 120)(x + 80) = 0$$

$$x = 120 \text{ or } x = -80$$

not a solution

∴ larger pipe fills in 120 min (2 hrs)
smaller pipe fills in 4 hrs.

$$(3b) \quad \frac{a^2b}{x^2} + \left(1 + \frac{b}{x}\right)a = 2b + \frac{a^2}{x}$$

$$a^2b + ax^2 + abx = 2bx^2 + a^2x$$

$$(a-2b)x^2 + (ab-a^2)x + a^2b = 0$$

$$(a-2b)x^2 + a(b-a)x + a^2b = 0$$

$$\left(\begin{array}{l} x - a \\ x = a \text{ or } x = \frac{ab}{a-2b} \end{array} \right) \left((a-2b)x - ab \right) = 0$$