

$$\begin{aligned}
 -0.88c &= \frac{v_x - 0.50c}{1 - \frac{(0.50c)v_x}{c^2}} \\
 &= \frac{v_x - 0.50c}{1 - \left(\frac{0.50v_x}{c}\right)}
 \end{aligned}$$

$$\therefore -0.88c + 0.44v_x = v_x - 0.50c$$

$$-0.38c = v_x (1 - 0.44)$$

$$\begin{aligned}
 \therefore v_x &= -0.678c \\
 &= 2.0 \times 10^8 \text{ m s}^{-1}
 \end{aligned}$$

Check:

v_x is -ve! OK agrees with rocket moving in -x direction

Phoey.