

$$\left(2 - \frac{5}{2}\right)^2 - \frac{11}{24} \div \left[ 2 - \left(\frac{11}{2} - 1\right) \div \left(\frac{3}{4} + \sqrt{\frac{1}{6}}\right) \right] =$$

$$\left(\frac{4-5}{2}\right)^2 - \frac{11}{24} \div \left[ 2 - \left(\frac{11-2}{2}\right) \div \left(\frac{3}{4} + \frac{1}{4}\right) \right] =$$

$$\frac{1}{4} - \frac{11}{24} \div \left[ 2 - \frac{9}{2} \div 1 \right] = \frac{1}{4} - \frac{11}{24} \div \left(-\frac{7}{2}\right) =$$

$$\frac{1}{4} + \frac{11 \cdot 2}{24 \cdot 2} = \frac{1}{4} + \frac{11}{12} = \frac{3}{12} + \frac{11}{12} = \frac{14}{12} = \frac{7}{6}$$

b)  $(3x-2)^2 - x(6x-7) = (2x+1)(2x-1) - (x+2)^2$

$$9x^2 + 4 - 12x - 6x^2 + 7x = 4x^2 - 1 - (x^2 + 4 + 4x)$$

$$9x^2 + 4 - 12x - 6x^2 + 7x - 4x^2 + 1 + x^2 + 4 + 4x = 0$$

$$-x + 9 = 0 \Rightarrow -x = -9 \Rightarrow \boxed{x=9}$$

6

$$\frac{x^2}{4} - \frac{x^2-2}{2} = \frac{x+1}{3} - \frac{x}{2}$$

$$\frac{3x^2}{12} - \frac{6(x^2-2)}{12} = \frac{4(x+1)}{12} - \frac{6x}{12}$$

$$3x^2 - 6x^2 + 12 = 4x + 4 - 6x$$

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

$$x = \frac{-2 \pm \sqrt{4+96}}{-6} = \frac{-2 \pm 10}{-6} = \begin{matrix} \rightarrow \frac{-12}{-6} = 2 \\ \rightarrow \frac{8}{-6} = -\frac{4}{3} \end{matrix}$$