Algebraic equation

Q1.. Simplify each of these.

a $\frac{x}{2} \div \frac{x}{3}$ **b** $\frac{2x}{7} \div \frac{4y}{14}$ **c** $\frac{4x}{3y} \div \frac{x}{2y}$

d $\frac{4y^2}{9x} \div \frac{2y}{3x^2}$ **e** $\frac{x}{2} \div \frac{x-2}{5}$ **f** $\frac{x-3}{15} \div \frac{5}{2x-6}$

g $\frac{2x+1}{2} \div \frac{4x+2}{4}$ **h** $\frac{x}{6} \div \frac{2x^2+x}{3}$ **i** $\frac{x-2}{12} \div \frac{4}{x-3}$

j $\frac{x-5}{10} \div \frac{x^2-5x}{5}$

Q2. Simplify each of these. Factorise and cancel where approite.

a $\frac{3x}{4} + \frac{x}{4}$ **b** $\frac{3x}{4} - \frac{x}{4}$ **c** $\frac{3x}{4} \times \frac{x}{4}$

d $\frac{3x}{4} \div \frac{x}{4}$ **e** $\frac{3x+1}{2} + \frac{x-2}{5}$ **f** $\frac{3x+1}{2} - \frac{x-2}{5}$

g $\frac{3x+1}{2} \times \frac{x-2}{5}$ **h** $\frac{x^2-9}{10} \times \frac{5}{x-3}$ **i** $\frac{2x+3}{5} \div \frac{6x+9}{10}$

j $\frac{2x^2}{9} - \frac{2y^2}{3}$

Q3. Show that each algebraic fraction simplifies to given expression.

a $\frac{2}{x+1} + \frac{5}{x+2} = 3$ simplifies to $3x^2 + 2x - 3 = 0$

b $\frac{4}{x-2} + \frac{7}{x+1} = 3$ simplifies to $3x^2 - 14x + 4 = 0$

c $\frac{3}{4x+1} - \frac{4}{x+2} = 2$ simplifies to $8x^2 + 31x + 2 = 0$

d $\frac{2}{2x-1} - \frac{6}{x+1} = 11$ simplifies to $22x^2 + 21x - 19 = 0$

e $\frac{3}{2x-1} - \frac{4}{3x-1} = 1$ simplifies to $x^2 - x = 0$

Solve the following equations.

a $\frac{4}{x+1} + \frac{5}{x+2} = 2$ **b** $\frac{18}{4x-1} - \frac{1}{x+1} = 1$ **c** $\frac{2x-1}{2} - \frac{6}{x+1} = 1$

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