a) $\left(\frac{x-5}{6}\right)^2 + \left(\frac{x-2}{3}\right)^2 = \left(\frac{x-1}{2}\right)^2$

$$\frac{x^2-10x+25}{36} + \frac{x^2-4x+4}{9} = \frac{x^2-2x+1}{4} \quad \Big| \cdot 36$$

$$x^2-10x+25+4(x^2-4x+4) = 9(x^2-2x+1)$$

$$x^2-10x+25+4x^2-16x+16 = 9x^2-18x+9$$

$$0 = 4x^2+8x-32 \quad \Big| :4$$

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

$$0 = (x+4)(x-2)$$

$\mathbf{x_1 = -4}$

$\mathbf{x_2 = 2}$

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b) $\frac{2x^2+3x-8}{x-2} = x+5+\frac{6}{x-2}$

$$\frac{2x^2+3x-8}{x-2} = x+5+\frac{6}{x-2} \quad \Big| \cdot (x-2)$$

$$2x^2+3x-8 = (x-2)(x+5)+6$$

$$2x^2+3x-8 = x^2+5x-2x-10+6$$

$$x^2 = 4$$

$$x_{1,2} = \pm 2$$

Die negative Lösung kann nicht benützt werden: der Nenner wird Null!

Einzige Lösung: **x = 2**

c) $\frac{x+11}{x+3} = \frac{2x+1}{x+5}$

$$\frac{x+11}{x+3} = \frac{2x+1}{x+5} \qquad \Big| \cdot (x+3)(x+5)$$

$$\begin{aligned} (x+11)(x+5) &= (2x+1)(x+3) \\ x^2+16x+55 &= 2x^2+7x+3 \\ 0 &= x^2-9x-52 \\ 0 &= (x-13)(x+4) \end{aligned}$$

$\mathbf{x_1 = 13}$

$\mathbf{x_2 = -4}$

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

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

$$\frac{x}{2(x-2)} - \frac{4}{x+2} = \frac{1}{x-2} \qquad \Big| \cdot 2(x-2)(x+2)$$

$$\begin{aligned} x(x+2) - 8(x-2) &= 2(x+2) \\ x^2+2x-8x+16 &= 2x+4 \\ x^2-8x+12 &= 0 \\ (x-6)(x-2) &= 0 \end{aligned}$$

Die Lösung $x = 2$ gehört nicht zum Definitionsbereich der Gleichung (der Nenner wird Null!).

Einzige Lösung: **x = 6**