1. Řešte rovnici pro $x \in R$: $3(2x-3)=5(2+x)$

$$6x-9=10+5x$$
$$6x-5x=10+9$$
$$x=19$$

Zkouška:

$$\left.\begin{aligned} L(19)&=3(38-3)=105\\ P(19)&=5\cdot(21)=105 \end{aligned}\right\} L=P$$

$$\underline{\underline{K=\{19\}}}$$

2. Řešte v množině Q rovnici: $\frac{x}{3}-1=\frac{x}{2}+2$

$$\frac{x}{3}-1=\frac{x}{2}+2 \qquad /\cdot 6$$
$$2x-6=3x+12$$
$$2x-3x=12+6$$
$$-x=18$$
$$x=-18$$

Zkouška:

$$\left.\begin{aligned} L(-18)&=-\frac{18}{3}-1=-7\\ P(-18)&=-\frac{18}{2}+2=-7 \end{aligned}\right\} L=P$$

$$\underline{\underline{K=\{-18\}}}$$

3. Řešte rovnici v Z: $(x+2)^2=(x+5)(x-4)$

$$(x+2)^2=(x+5)(x-4)$$
$$x^2+4x+4=x^2+5x-4x-20$$
$$3x=-24$$
$$x=-8$$

Zkouška:

$$\left.\begin{aligned} L(-8)&=(-6)^2=36\\ P(-8)&=(-3)\cdot(-12)=36 \end{aligned}\right\} L=P$$

$$\underline{\underline{K=\{-8\}}}$$

4. Řešte v R rovnici: $\frac{5-x}{3}+x=\frac{2x}{3}-4$

$$\frac{5-x}{3}+x=\frac{2x}{3}-4 \qquad /\cdot 3$$
$$5-x+3x=2x-12$$
$$0x=-17$$
$$\underline{\underline{K=\varnothing}}$$

! Pozor: Chybný zápis $K=\{\varnothing\}$. Možno: $K=\{\ \}$

5. Řešte v R rovnici: $(x-3)^2+1=(x-3)(x-2)-x+4$

$$(x-3)^2+1=(x-3)(x-2)-x+4$$
$$x^2-6x+9+1=x^2-5x+6-x+4$$
$$-6x+6x=10-10$$
$$0=0$$
$$\underline{\underline{K=R}}$$

6. Řešte rovnici pro $x\in R$: $8(3x-2)-13x=5(12-3x)+7$

$$8(3x-2)-13x=5(12-3x)+7$$
$$24x-16-13x=60-15x+7$$
$$26x=83$$
$$x=\frac{83}{26}$$

7. Řešte rovnici v Z: $(x+2)(x+8)=(x-10)^2$

$$(x+2)(x+8)=(x-10)^2$$
$$\cancel{x^2}+8x+2x+16=\cancel{x^2}-10x-10x+100$$
$$30x=84$$
$$x=\frac{84}{30}\Rightarrow x=\frac{14}{5}$$

Zkouška:

$$\left.\begin{aligned} L\left(\frac{14}{5}\right)&=\left(\frac{14}{5}+\frac{10}{5}\right)\left(\frac{14}{5}+\frac{40}{5}\right)=\frac{24}{5}\cdot\frac{54}{5}=\frac{1296}{25}\\ P\left(\frac{14}{5}\right)&=\left(\frac{14}{5}-\frac{50}{5}\right)^2=\frac{1296}{25}\end{aligned}\right\}L=P \qquad \underline{\underline{K=\left\{\frac{14}{5}\right\}}}$$

8. Řešte v R rovnici: $\dfrac{x-3}{6}+x=\dfrac{2x-1}{2}-\dfrac{4-x}{2}$

$$\frac{x-3}{6}+x=\frac{2x-1}{2}-\frac{4-x}{2} \quad /\cdot 6$$
$$x-3+6x=6x-3-12+3x$$
$$7x-3=9x-15$$
$$-2x=-12 \quad \Rightarrow \quad x=6$$

Zkouška:

$$\left.\begin{aligned} L(6)&=\frac{1}{2}+6=\frac{13}{2}\\ P(6)&=\frac{11}{2}-\frac{-2}{2}=\frac{13}{2}\end{aligned}\right\} L=P \qquad \underline{\underline{K=\{6\}}}$$

9. Řešte v R rovnici: $(x+2)(x-1)^2=x(x^2-4)+4$

$$(x+2)(x-1)^2=x(x^2-4)+4$$
$$(x+2)(x^2-2x+1)=x^3-4x+4$$
$$\cancel{x^3}\cancel{-2x^2}+x\cancel{+2x^2}-4x+2=\cancel{x^3}-4x+4$$
$$-3x+2=-4x+4$$
$$x=2$$

Zkouška:

$$\left.\begin{aligned} L(2)&=4\cdot 1=4\\ P(2)&=2\cdot 0+4=4\end{aligned}\right\} L=P$$

$$\underline{\underline{K=\{2\}}}$$

10. Řešte rovnici pro $x\in R$: $4x-3(20-x)=6x-7(11-x)$

$$4x-3(20-x)=6x-7(11-x)$$
$$4x-60+3x=6x-77+7x$$
$$17=6x$$
$$x=\frac{17}{6}$$

Zkouška:

$$\left.\begin{aligned} L\left(\frac{17}{6}\right)&=\frac{68}{6}-\frac{360}{6}+\frac{51}{6}=-\frac{241}{6}\\ P\left(\frac{17}{6}\right)&=\frac{102}{6}-\frac{462}{6}+\frac{119}{6}=-\frac{241}{6}\end{aligned}\right\} L=P$$

$$\underline{\underline{K=\left\{\frac{17}{6}\right\}}}$$

11. Řešte v množině Q rovnici: $\frac{4x}{9}-\frac{5x}{18}=3$

$$\frac{4x}{9}-\frac{5x}{18}=3 \qquad /\cdot 18$$
$$8x-5x=54$$
$$3x=54$$
$$\underline{\underline{x=18}}$$

Zkouška:

$$\left.\begin{aligned} L(18)&=\frac{72}{9}-\frac{90}{18}=8-5=3\\ P(18)&=3 \end{aligned}\right\} L=P$$

$$\underline{\underline{K=\{18\}}}$$

12. Řešte v R rovnici: $\frac{5x-4}{2}-\frac{16x+1}{7}=0$

$$\frac{5x-4}{2}-\frac{16x+1}{7}=0 \quad /\cdot 14$$
$$35x-28=32x+2=0$$
$$3x=30$$
$$x=10$$

Zkouška:

$$\left.\begin{aligned} L(10)&=23-23=0\\ P(10)&=0 \end{aligned}\right\} L=P$$

$$\underline{\underline{K=\{10\}}}$$

13. Řešte v Z: $(x-2)^2+4=(x-2)(x-1)+2(2-x)$

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

Zkouška:

$$\left.\begin{aligned} L(-2)&=(-2-2)^2+4=20\\ P(-2)&=(-2-2)(-2-1)+2(2+2)=12+8=20 \end{aligned}\right\} L=P$$

$$\underline{\underline{K=\{-2\}}}$$