Aufgaben zu quadratischen Gleichungen

1. Bestimme mittels p-q-Formel die Lösung(en) der quadratischen Gleichung. Überprüfe anhand der Probe die Ergebnisse.

a) $x^2 + 8x + 16 = 49$

b) $x^2 - 8x + 16 = 0$

c) $x^2 - 6x + 9 = 36$

d) $x^2 - x + 0{,}25 = 1{,}44$

e) $y^2 + 16y + 64 = 7$

f) $x^2 - 1{,}8x + 0{,}81 = 0{,}25$

g) $z^2 - 3z + 2{,}25 = 5$

h) $z^2 - 5z + 6{,}25 = 8$

i) $x^2 + 5x + \frac{25}{4} = \frac{81}{4}$

2. Ermittle bei folgenden quadratischen Gleichungen die Lösungsmenge.

a) $50x^2 - 18 = 0$

b) $50 - 18x^2 = 0$

c) $4x^2 - 1 = 0$

d) $4x^2 - x = 0$

e) $z^2 - 4z = 0$

f) $z^2 - 4 = 0$

g) $y^2 + 0{,}9y = 0$

h) $y^2 - 0{,}09 = 0$

3. Ermittle die Lösungsmenge.

a) $x^2 + (8 - x)^2 = (8 - 2x)^2$

b) $(x - 1)^2 = 5(x^2 - 1)$

c) $(2x - 5)^2 - (x - 6)^2 = 80$

d) $(x - 5)(x - 6) + (x - 4)(x - 7) = 10$

4. Ermittle die Lösungsmenge der quadratischen Gleichung.

a) $(x + 4)(x - 4) = 84$

b) $(x + 7)(x - 5) = 45$

c) $(x - 9)(x + 2) = -5{,}6x$

d) $(x - 3)(x - 4) = 1{,}4x$

e) $(3x - 2)(2x - 3) = 5(x^2 - 6)$

f) $(8 - 3y)(5y + 2) = 4y(11 - 4y)$

Lösungen

1. Bestimme mittels p-q-Formel die Lösung(en) der quadratischen Gleichung. Überprüfe anhand der Probe die Ergebnisse.

a) $x^2 + 8x + 16 = 49$

$x^2 + 8x + 16 = 49 \quad | - 49$

$x^2 + 8x - 33$

$x_{1,2} = -\frac{8}{2} \pm \sqrt{\left(\frac{8}{2}\right)^2 + 33}$

$x_{1,2} = -4 \pm \sqrt{(4)^2 + 33}$

$x_{1,2} = -4 \pm \sqrt{16 + 33}$

$x_{1,2} = -4 \pm \sqrt{49}$

$x_{1,2} = -4 \pm 7$

$x_1 = -4 - 7 = -11$

$x_2 = -4 + 7 = 3$

$x = -11$

$(-11)^2 + 8 \cdot (-11) + 16 = 49$

$121 - 88 + 16 = 49$

$49 = 49$

$x = 3$

$(3)^2 + 8 \cdot 3 + 16 = 49$

$9 + 24 + 16 = 49$

$49 = 49$

b) $x^2 - 8x + 16 = 0$

$x^2 - 8x + 16 = 0$

$$x_{1,2} = \frac{8}{2} \pm \sqrt{\left(\frac{8}{2}\right)^2 - 16}$$

$$x_{1,2} = 4 \pm \sqrt{(4)^2 - 16}$$

$$x_{1,2} = 4 \pm \sqrt{16 - 16}$$

$$x_{1,2} = 4 \pm \sqrt{0}$$

$x_{1,2} = 4$

$x = 4$

$(4)^2 - 8 \cdot 4 + 16 = 0$

$16 - 32 + 16 = 0$

$32 - 32 = 0$

$0 = 0$

c) $x^2 - 6x + 9 = 36$

$x^2 - 6x + 9 = 36 \quad | - 36$

$x^2 - 6x - 27 = 0$

$$x_{1,2} = \frac{6}{2} \pm \sqrt{\left(\frac{6}{2}\right)^2 + 27}$$

$$x_{1,2} = 3 \pm \sqrt{(3)^2 + 27}$$

$$x_{1,2} = 3 \pm \sqrt{9 + 27}$$

$$x_{1,2} = 3 \pm \sqrt{36}$$

$x_{1,2} = 3 \pm 6$

$x_1 = 3 - 6 = -3$

$x_2 = 3 + 6 = 9$

$x_1 = -3$

$(-3)^2 - 6 \cdot (-3) + 9 = 36$

$9 + 18 + 9 = 36$

$36 = 36$

$x_2 = 9$

$(9)^2 - 6 \cdot (9) + 9 = 36$

$81 - 54 + 9 = 36$

$36 = 36$

d) $x^2 - x + 0{,}25 = 1{,}44$

$x^2 - x + 0{,}25 = 1{,}44 \quad | - 1{,}44$

$x^2 - x - 1{,}19$

$$x_{1,2} = \frac{1}{2} \pm \sqrt{\left(\frac{1}{2}\right)^2 + 1{,}19}$$

$$x_{1,2} = 0{,}5 \pm \sqrt{(0{,}5)^2 + 1{,}19}$$

$$x_{1,2} = 0{,}5 \pm \sqrt{0{,}25 + 1{,}19}$$

$$x_{1,2} = 0{,}5 \pm \sqrt{1{,}44}$$

$x_{1,2} = 0{,}5 \pm 1{,}2$

$x_1 = 0{,}5 - 1{,}2 = -0{,}7$

$x_2 = 0{,}5 + 1{,}2 = 1{,}7$

$x_1 = -0{,}7$

$(-0{,}7)^2 - (-0{,}7) + 0{,}25 = 1{,}44$

$0{,}49 + 0{,}7 + 0{,}25 = 1{,}44$

$1{,}44 = 1{,}44$

$x_2 = 1{,}7$

$(1,7)^2 - 1,7 + 0,25 = 1,44$

$2,89 - 1,7 + 0,25 = 1,44$

$1,44 = 1,44$

e) $y^2 + 16y + 64 = 7$

$y^2 + 16y + 64 = 7 \quad | - 7$

$y^2 + 16y + 57 = 0$

$$y_{1,2} = -\frac{16}{2} \pm \sqrt{\left(\frac{16}{2}\right)^2 - 57}$$

$$y_{1,2} = -8 \pm \sqrt{(8)^2 - 57}$$

$$y_{1,2} = -8 \pm \sqrt{64 - 57}$$

$$y_{1,2} = -8 \pm \sqrt{7}$$

$$y_1 = -8 - \sqrt{7}$$

$$y_2 = -8 + \sqrt{7}$$

$$y_1 = -8 - \sqrt{7}$$

$$(-8 - \sqrt{7})^2 + 16 \cdot (-8 - \sqrt{7}) + 64 = 7$$

$$(-8)^2 - 2 \cdot (-8) \cdot \sqrt{7} + (\sqrt{7})^2 + 16 \cdot (-8) + 16 \cdot (-\sqrt{7}) + 64 = 7$$

$$64 + 16 \cdot \sqrt{7} + 7 - 128 - 16 \cdot \sqrt{7} + 64 = 7$$

$7 = 7$

$$y_2 = -8 + \sqrt{7}$$

$$(-8 + \sqrt{7})^2 + 16 \cdot (-8 + \sqrt{7}) + 64 = 7$$

$$(-8)^2 + 2 \cdot (-8) \cdot \sqrt{7} + (\sqrt{7})^2 + 16 \cdot (-8) + 16 \cdot (\sqrt{7}) + 64 = 7$$

$$64 + - 16 \cdot \sqrt{7} + 7 - 128 + 16 \cdot \sqrt{7} + 64 = 7$$

$7 = 7$

f) $x^2 - 1{,}8x + 0{,}81 = 0{,}25$

$x^2 - 1{,}8x + 0{,}81 = 0{,}25 \quad | - 0{,}25$

$x^2 - 1{,}8x + 0{,}56$

$x_{1,2} = \frac{1{,}8}{2} \pm \sqrt{\left(\frac{1{,}8}{2}\right)^2 - 0{,}56}$

$x_{1,2} = 0{,}9 \pm \sqrt{(0{,}9)^2 - 0{,}56}$

$x_{1,2} = 0{,}9 \pm \sqrt{0{,}81 - 0{,}56}$

$x_{1,2} = 0{,}9 \pm \sqrt{0{,}25}$

$x_{1,2} = 0{,}9 \pm 0{,}5$

$x_1 = 0{,}9 - 0{,}5 = 0{,}4$

$x_2 = 0{,}9 + 0{,}5 = 1{,}4$

$x = 0{,}4$

$(0{,}4)^2 - 1{,}8 \cdot (0{,}4) + 0{,}81 = 0{,}25$

$0{,}16 - 0{,}72 + 0{,}81 = 0{,}25$

$0{,}25 = 0{,}25$

$x = 1{,}4$

$(1{,}4)^2 - 1{,}8 \cdot (1{,}4) + 0{,}81 = 0{,}25$

$1{,}96 - 2{,}52 + 0{,}81 = 0{,}25$

$0{,}25 = 0{,}25$

g) $z^2 - 3z + 2{,}25 = 5$

$z^2 - 3z + 2{,}25 = 5 \quad | - 0{,}25$

$z^2 - 3z - 2{,}75 = 0$

$z_{1,2} = \frac{3}{2} \pm \sqrt{\left(\frac{3}{2}\right)^2 + 2{,}75}$

$z_{1,2} = 1{,}5 \pm \sqrt{(1{,}5)^2 + 2{,}75}$

$z_{1,2} = 1{,}5 \pm \sqrt{2{,}25 + 2{,}75}$

$z_{1,2} = 1{,}5 \pm \sqrt{5}$

$z_1 = 1{,}5 - \sqrt{5}$

$z_2 = 1{,}5 + \sqrt{5}$

$z_1 = 1{,}5 - \sqrt{5}$

$(1{,}5 - \sqrt{5})^2 - 3 \cdot (1{,}5 - \sqrt{5}) + 2{,}25 = 5$

$(1{,}5)^2 - 2 \cdot 1{,}5 \cdot \sqrt{5} + (\sqrt{5})^2 - 3 \cdot 1{,}5 - 3 \cdot (-\sqrt{5}) + 2{,}25 = 5$

$2{,}25 - 3 \cdot \sqrt{5} + 5 - 4{,}5 + 3 \cdot \sqrt{5} + 2{,}25 = 5$

$5 = 5$

$z_2 = 1{,}5 + \sqrt{5}$

$(1{,}5 + \sqrt{5})^2 - 3 \cdot (1{,}5 + \sqrt{5}) + 2{,}25 = 5$

$(1{,}5)^2 + 2 \cdot 1{,}5 \cdot \sqrt{5} + (\sqrt{5})^2 - 3 \cdot 1{,}5 - 3 \cdot \sqrt{5} + 2{,}25 = 5$

$2{,}25 + 3 \cdot \sqrt{5} + 5 - 4{,}5 - 3 \cdot \sqrt{5} + 2{,}25 = 5$

$5 = 5$

h) $z^2 - 5z + 6{,}25 = 8$

$z^2 - 5z + 6{,}25 = 8 \quad | - 8$

$z^2 - 5z - 1{,}75 = 0$

$z_{1,2} = \frac{5}{2} \pm \sqrt{\left(\frac{5}{2}\right)^2 + 1{,}75}$

$z_{1,2} = 2{,}5 \pm \sqrt{(2{,}5)^2 + 1{,}75}$

$z_{1,2} = 2{,}5 \pm \sqrt{6{,}25 + 1{,}75}$

$z_{1,2} = 2{,}5 \pm \sqrt{8}$

$z_1 = 2{,}5 - \sqrt{8}$

$z_2 = 2{,}5 + \sqrt{8}$

$z_1 = 2{,}5 - \sqrt{8}$

$(2{,}5 - \sqrt{8})^2 - 5 \cdot (2{,}5 - \sqrt{8}) + 6{,}25 = 8$

$(2{,}5)^2 - 2 \cdot 2{,}5 \cdot \sqrt{8} + (\sqrt{8})^2 - 12{,}5 + 5 \cdot \sqrt{8} + 6{,}25 = 8$

$6{,}25 - 5 \cdot \sqrt{8} + 8 - 12{,}5 + 5 \cdot \sqrt{8} + 6{,}25 = 8$

$8 = 8$

$z_2 = 2{,}5 + \sqrt{8}$

$(2{,}5 + \sqrt{8})^2 - 5 \cdot (2{,}5 + \sqrt{8}) + 6{,}25 = 8$

$(2{,}5)^2 + 2 \cdot 2{,}5 \cdot \sqrt{8} + (\sqrt{8})^2 - 12{,}5 - 5 \cdot \sqrt{8} + 6{,}25 = 8$

$6{,}25 + 5 \cdot \sqrt{8} + 8 - 12{,}5 - 5 \cdot \sqrt{8} + 6{,}25 = 8$

$8 = 8$

i) $x^2 + 5x + \frac{25}{4} = \frac{81}{4}$

$x^2 + 5x + \frac{25}{4} = \frac{81}{4} \quad | - \frac{81}{4}$

$x^2 + 5x - 14 = 0$

$x_{1,2} = -\frac{5}{2} \pm \sqrt{\left(\frac{5}{2}\right)^2 + 14}$

$x_{1,2} = -2{,}5 \pm \sqrt{(2{,}5)^2 + 14}$

$x_{1,2} = -2{,}5 \pm \sqrt{6{,}25 + 14}$

$x_{1,2} = -2{,}5 \pm \sqrt{20{,}25}$

$x_{1,2} = -2{,}5 \pm 4{,}5$

$x_1 = -2{,}5 - 4{,}5 = -7$

$x_2 = -2{,}5 + 4{,}5 = 2$

$x_1 = -7$

$(-7)^2 + 5 \cdot (-7) + \frac{25}{4} = \frac{81}{4}$

$49 - 35 + \frac{25}{4} = \frac{81}{4}$

$\frac{81}{4} = \frac{81}{4}$

$x_2 = 2$

$(2)^2 + 5 \cdot 2 + \frac{25}{4} = \frac{81}{4}$

$4 + 10 + \frac{25}{4} = \frac{81}{4}$

$\frac{81}{4} = \frac{81}{4}$

2. Ermittle bei folgenden quadratischen Gleichungen die Lösungsmenge.

a) $50x^2 - 18 = 0$

$50x^2 - 18 = 0 \quad | + 18$

$50x^2 = 18 \quad | : 50$

$x^2 = 0{,}36 \quad | \sqrt{}$

$x_{1,2} = \pm 0{,}6$

$L = \{-0{,}6; 0{,}6\}$

b) $50 - 18x^2 = 0$

$50 - 18x^2 = 0 \quad | + 18x^2$

$50 = 18x^2 \quad | : 18$

$\frac{50}{18} = x^2 \quad | \sqrt{}$

$x_{1,2} = \pm \frac{5}{3}$

$L = \{-\frac{5}{3}; \frac{5}{3}\}$

c) $4x^2 - 1 = 0$

$4x^2 - 1 = 0 \quad | + 1$

$4x^2 = 1 \quad | : 4$

$x^2 = 0{,}25 \quad | \sqrt{}$

$x_{1,2} = \pm 0{,}5$

$L = \{-0{,}5; 0{,}5\}$

d) $4x^2 - x = 0$

$4x^2 - x = 0$

$x \cdot (4x - 1) = 0$

$x_1 = 0$

$4x - 1 = 0 \quad | + 1$

$4x = 1 \quad | : 4$

$x_2 = 0{,}25$

$L = \{0; 0{,}25\}$

e) $z^2 - 4z = 0$

$z^2 - 4z = 0$

$z \cdot (z - 4) = 0$

$z_1 = 0$

$z - 4 = 0 \quad | + 4$

$z_2 = 4$

$L = \{0; 4\}$

f) $z^2 - 4 = 0$

$z^2 - 4 = 0 \quad | + 4$

$z^2 = 4 \quad | \sqrt{}$

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

$L = \{-2; 2\}$

g) $y^2 + 0{,}9y = 0$

$y^2 + 0{,}9y = 0$

$y \cdot (y + 0{,}9) = 0$

$y_1 = 0$

$y + 0{,}9 = 0 \quad | - 0{,}9$

$y_2 = -0{,}9$

$L = \{-0{,}9; 0\}$

h) $y^2 - 0{,}09 = 0$

$y^2 - 0{,}09 = 0 \quad | + 0{,}09$

$y^2 = 0{,}09 \quad | \sqrt{}$

$y_{1,2} = \pm 0{,}3$

$L = \{-0{,}3; 0{,}3\}$

3. Ermittle die Lösungsmenge.

a) $x^2 + (8 - x)^2 = (8 - 2x)^2$

$x^2 + (8 - x)^2 = (8 - 2x)^2$

$x^2 + (8)^2 - 2 \cdot 8 \cdot x + (x)^2 = (8)^2 - 2 \cdot 8 \cdot 2x + (2x)^2$

$x^2 + 64 - 16x + x^2 = 64 - 32x + 4x^2$

$2x^2 + 64 - 16x = 64 - 32x + 4x^2 \quad | - 2x^2$

$64 - 16x = 64 - 32x + 2x^2 \quad | + 16x$

$64 = 64 - 16x + 2x^2 \quad | - 64$

$0 = -16x + 2x^2 \quad | : 2$

$0 = -8x + x^2$

$0 = x \cdot (-8 + x)$

$x_1 = 0$

$-8 + x = 0 \quad | + 8$

$x_2 = 8$

$L = \{0; 8\}$

b) $(x - 1)^2 = 5(x^2 - 1)$

$(x - 1)^2 = 5(x^2 - 1)$

$(x)^2 - 2 \cdot x \cdot 1 + (1)^2 = 5 \cdot x^2 - 5 \cdot 1$

$x^2 - 2x + 1 = 5x^2 - 5 \quad | - x^2$

$-2x + 1 = 4x^2 - 5 \quad | - 1$

$-2x = 4x^2 - 6 \quad | + 2x$

$0 = 4x^2 + 2x - 6 \quad | : 4$

$0 = x^2 + 0{,}5x - 1{,}5$

$x_{1,2} = -\frac{0{,}5}{2} \pm \sqrt{\left(\frac{0{,}5}{2}\right)^2 + 1{,}5}$

$x_{1,2} = -0{,}25 \pm \sqrt{(0{,}25)^2 + 1{,}5}$

$x_{1,2} = -0{,}25 \pm \sqrt{0{,}0625 + 1{,}5}$

$x_{1,2} = -0{,}25 \pm \sqrt{1{,}5625}$

$x_{1,2} = -0{,}25 \pm 1{,}25$

$x_1 = -0{,}25 - 1{,}25 = -1{,}5$

$x_2 = -0{,}25 + 1{,}25 = 1$

$L = \{-1{,}5;\ 1\}$

c) $(2x - 5)^2 - (x - 6)^2 = 80$

$(2x - 5)^2 - (x - 6)^2 = 80$

$(2x)^2 - 2 \cdot 2x \cdot 5 + (5)^2 - ((x)^2 - 2 \cdot x \cdot 6 + (6)^2) = 80$

$4x^2 - 20x + 25 - (x^2 - 12x + 36) = 80$

$4x^2 - 20x + 25 - x^2 + 12x - 36 = 80$

$3x^2 - 8x - 11 = 80 \quad | - 80$

$3x^2 - 8x - 91 = 0 \quad | : 3$

$x^2 - \frac{8}{3}x - \frac{91}{3} = 0$

$x_{1,2} = \frac{8}{6} \pm \sqrt{\left(\frac{8}{6}\right)^2 + \frac{91}{3}}$

$x_{1,2} = \frac{8}{6} \pm \sqrt{\frac{16}{9} + \frac{91}{3}}$

$x_{1,2} = \frac{8}{6} \pm \sqrt{\frac{289}{9}}$

$x_{1,2} = \frac{8}{6} \pm \frac{17}{3}$

$x_{1,2} = \frac{8}{6} - \frac{17}{3} = -\frac{13}{3}$

$x_{1,2} = \frac{8}{6} + \frac{17}{3} = 7$

$L = \{-\frac{13}{3}; 7\}$

d) $(x - 5)(x - 6) + (x - 4)(x - 7) = 10$

$(x - 5)(x - 6) + (x - 4)(x - 7) = 10$

$x \cdot x + x \cdot (-6) + x \cdot (-5) + (-5) \cdot (-6) + x \cdot x + x \cdot (-7) + (-4) \cdot x + (-4) \cdot (-7) = 10$

$x^2 - 6x - 5x + 30 + x^2 - 7x - 4x + 28 = 10$

$2x^2 - 22x + 58 = 10 \quad | - 10$

$2x^2 - 22x + 48 = 0 \quad | : 2$

$x^2 - 11x + 24 = 0$

$x_{1,2} = \frac{11}{2} \pm \sqrt{(\frac{11}{2})^2 - 24}$

$x_{1,2} = 5{,}5 \pm \sqrt{(5{,}5)^2 - 24}$

$x_{1,2} = 5{,}5 \pm \sqrt{30{,}25 - 24}$

$x_{1,2} = 5{,}5 \pm \sqrt{6{,}25}$

$x_{1,2} = 5{,}5 \pm 2{,}5$

$x_1 = 5{,}5 - 2{,}5 = 3$

$x_2 = 5{,}5 + 2{,}5 = 8$

$L = \{3; 8\}$

4. Ermittle die Lösungsmenge der quadratischen Gleichung.

a) $(x + 4)(x - 4) = 84$

$(x + 4)(x - 4) = 84$

$x \cdot x - 4 \cdot 4 = 84$

$x^2 - 16 = 84 \quad | + 16$

$x^2 = 100 \quad | \sqrt{}$

$x_{1,2} = \pm 10$

$L = \{-10; 10\}$

b) $(x + 7)(x - 5) = 45$

$(x + 7)(x - 5) = 45$

$x \cdot x + x \cdot (-5) + 7 \cdot x + 7 \cdot (-5) = 45$

$x^2 - 5x + 7x - 35 = 45$

$x^2 + 2x - 35 = 45 \quad | - 35$

$x^2 + 2x - 80 = 0$

$x_{1,2} = -\frac{2}{2} \pm \sqrt{\left(\frac{2}{2}\right)^2 + 80}$

$x_{1,2} = -1 \pm \sqrt{(1)^2 + 80}$

$x_{1,2} = -1 \pm \sqrt{1 + 80}$

$x_{1,2} = -1 \pm \sqrt{81}$

$x_{1,2} = -1 \pm 9$

$x_1 = -1 - 9 = -10$

$x_2 = -1 + 9 = 8$

$L = \{-10; 8\}$

c) $(x - 9)(x + 2) = -5{,}6x$

$(x - 9)(x + 2) = -5{,}6x$

$x \cdot x + x \cdot 2 + (-9) \cdot x + (-9) \cdot 2 = -5{,}6x$

$x^2 + 2x - 9x - 18 = -5{,}6x$

$x^2 - 7x - 18 = -5{,}6x \quad | + 5{,}6x$

$x^2 - 1{,}4x - 18 = 0$

$x_{1,2} = \frac{1,4}{2} \pm \sqrt{\left(\frac{1,4}{2}\right)^2 + 18}$

$x_{1,2} = 0,7 \pm \sqrt{(0,7)^2 + 18}$

$x_{1,2} = 0,7 \pm \sqrt{0,49 + 18}$

$x_{1,2} = 0,7 \pm \sqrt{18,49}$

$x_{1,2} = 0,7 \pm 4,3$

$x_1 = 0,7 - 4,3 = -3,6$

$x_2 = 0,7 + 4,3 = 5$

$L = \{-3,6; 5\}$

d) $(x - 3)(x - 4) = 1,4x$

$(x - 3)(x - 4) = 1,4x$

$(x - 3)(x - 4) = 1,4x$

$x \cdot x + x \cdot (-4) + (-3) \cdot x + (-3) \cdot (-4) = 1,4x$

$x^2 - 4x - 3x + 12 = 1,4x$

$x^2 - 7x + 12 = 1,4x \quad | - 1,4x$

$x^2 - 8,4x + 12 = 0$

$x_{1,2} = \frac{8,4}{2} \pm \sqrt{\left(\frac{8,4}{2}\right)^2 - 12}$

$x_{1,2} = 4,2 \pm \sqrt{(4,2)^2 - 12}$

$x_{1,2} = 4,2 \pm \sqrt{17,64 - 12}$

$x_{1,2} = 4,2 \pm \sqrt{5,64}$

$x_1 = 4,2 - \sqrt{5,64}$

$x_2 = 4,2 + \sqrt{5,64}$

$L = \{4,2 - \sqrt{5,64}; 4,2 + \sqrt{5,64}\}$

e) $(3x - 2)(2x - 3) = 5(x^2 - 6)$

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

$3x \cdot 2x + 3x \cdot (-3) + (-2) \cdot (2x) + (-2) \cdot (-3) = 5 \cdot x2 + 5 \cdot (-6)$

$6x^2 - 9x - 4x + 6 = 5x^2 - 30$

$6x^2 - 13x + 6 = 5x^2 - 30 \quad | - 5x^2$

$x^2 - 13x + 6 = -30 \quad | + 30$

$x^2 - 13x + 36 = 0$

$x_{1,2} = \frac{13}{2} \pm \sqrt{\left(\frac{13}{2}\right)^2 - 36}$

$x_{1,2} = 6{,}5 \pm \sqrt{(6{,}5)^2 - 36}$

$x_{1,2} = 6{,}5 \pm \sqrt{42{,}25 - 36}$

$x_{1,2} = 6{,}5 \pm \sqrt{42{,}25 - 36}$

$x_{1,2} = 6{,}5 \pm \sqrt{6{,}25}$

$x_{1,2} = 6{,}5 \pm 2{,}5$

$x_1 = 6{,}5 - 2{,}5 = 4$

$x_2 = 6{,}5 + 2{,}5 = 9$

$L = \{4; 9\}$

f) $(8 - 3y)(5y + 2) = 4y(11 - 4y)$

$(8 - 3y)(5y + 2) = 4y(11 - 4y)$

$8 \cdot 5y + 8 \cdot 2 + (-3y) \cdot 5y + (-3y) \cdot 2 = 4y \cdot 11 + 4y \cdot (-4y)$

$40y + 16 - 15y^2 - 6y = 44y - 16y^2$

$34y + 16 - 15y^2 = 44y - 16y^2 \quad | + 16y^2$

$34y + 16 + y^2 = 44y \quad | - 44y$

$-10y + 16 + y^2 = 0$

$y_{1,2} = \frac{10}{2} \pm \sqrt{\left(\frac{10}{2}\right)^2 - 16}$

$y_{1,2} = 5 \pm \sqrt{(5)^2 - 16}$

$y_{1,2} = 5 \pm \sqrt{25 - 16}$

$y_{1,2} = 5 \pm \sqrt{9}$

$y_{1,2} = 5 \pm 3$

$y_1 = 5 - 3 = 2$

$y_2 = 5 + 3 = 8$

$L = \{2; 8\}$