1a) $2x^2 + 7x + 3 = 0$

$a = 2 \quad b = 7 \quad c = 3$

$$x_{1/2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-7 \pm \sqrt{49 - 4 \cdot 2 \cdot 3}}{2 \cdot 2}$$

$$= \frac{-7 \pm \sqrt{49 - 24}}{4}$$

$$= \frac{-7 \pm 5}{4}$$

$$x_1 = \frac{-7+5}{4} = \frac{-2}{4} = -\frac{1}{2}$$

$$x_2 = \frac{-7-5}{4} = \frac{-12}{4} = -3$$

$$L = \left\{-\frac{1}{2}; -3\right\}$$

1b) $-15x^2 - 19x + 56 = 0$

$$x_{1/2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x_{1/2} = \frac{-(-19) \pm \sqrt{(-19)^2 - 4 \cdot (-15) \cdot 56}}{2 \cdot (-15)}$$

Vorzeichen beachten!

$$= \frac{19 \pm \sqrt{361 + 3360}}{-30}$$

$$= \frac{19 \pm \sqrt{3721}}{-30}$$

$$= \frac{19 \pm 61}{-30}$$

$$x_1 = \frac{19+61}{-30} = -\frac{80}{30} = -\frac{8}{3}$$

$$x_2 = \frac{19-61}{-30} = \frac{-42}{-30} = +\frac{7}{5} \qquad L = \left\{-\frac{8}{3}; +\frac{7}{5}\right\}$$

1c) $0{,}5x^2 + 0{,}15x - 0{,}27 = 0$

$$x_{1|2} = \frac{-0{,}15 \pm \sqrt{0{,}15^2 - 4 \cdot 0{,}5 \cdot (-0{,}27)}}{2 \cdot 0{,}5}$$

$$x_{1|2} = \frac{-0{,}15 \pm \sqrt{0{,}0225 + 0{,}54}}{1}$$

$$x_{1|2} = -0{,}15 \pm \sqrt{0{,}5625}$$

$$x_{1|2} = -0{,}15 \pm 0{,}75$$

$$x_1 = 0{,}6 \qquad x_2 = -0{,}9$$

$$L = \{0{,}6; -0{,}9\}$$

1d) $4x^2 = 8x + 1 \quad | -8x - 1$

$$4x^2 - 8x - 1 = 0$$

$$x_{1|2} = \frac{-(-8) \pm \sqrt{(-8)^2 - 4 \cdot 4 \cdot (-1)}}{2 \cdot 4}$$

$$x_{1/2} = \frac{8 \pm \sqrt{64+16}}{8}$$

$$x_{1/2} = \frac{8 \pm \sqrt{80}}{8} = \frac{8 \pm \sqrt{16 \cdot 5}}{8} = \frac{8 \pm 4\sqrt{5}}{8}$$

$$x_{1/2} = 1 \pm \frac{1}{2}\sqrt{5}$$

$$x_1 = 1 + \frac{1}{2}\sqrt{5} \qquad x_2 = 1 - \frac{1}{2}\sqrt{5}$$

$$L = \left\{ 1 + \frac{1}{2}\sqrt{5} \; ; \; 1 - \frac{1}{2}\sqrt{5} \right\}$$

2a) $x^2 + 12x + 38 = 0$

$D = b^2 - 4ac$

$D = 12^2 - 4 \cdot 1 \cdot 38$

$D = 144 - 152$

$D < 0 \Rightarrow$ keine Lösungen

2b) $4x^2 - 12x + 9 = 0$

$D = b^2 - 4ac$

$D = (-12)^2 - 4 \cdot 4 \cdot 9$

$D = 144 - 144$

$D = 0 \Rightarrow$ eine Lösung

2c) $7x^2 - 2x - 11 = 0$

$D = b^2 - 4ac$

$D = (-2)^2 - 4 \cdot 7 \cdot (-11)$

$D = 4 + 308$

$D > 0 \Rightarrow$ zwei Lösungen