a) $x^2 + 4x - 2 = 0$

p = 4 q = -2

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

$$= -2 \pm \sqrt{6}$$

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

$$\Leftrightarrow x^2 - 3x + 1 = 0$$

p = -3 q = 1

$$x_{1,2} = -\left(-\frac{3}{2}\right) \pm \sqrt{\left(\frac{3}{2}\right)^2 - 1}$$

$$= \frac{3}{2} \pm \sqrt{\frac{5}{4}} = \frac{3 \pm \sqrt{5}}{2}$$

c) $x^2 + 8x + 16 = 0$

p = 8 q = 16

$$x_{1,2} = -\frac{8}{2} \pm \sqrt{\left(\frac{8}{2}\right)^2 - 16} = -\frac{8}{2} \pm 0$$

$$x = -4$$

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

p = -2 q = -4

$$x_{1,2} = \frac{2}{2} \pm \sqrt{\left(\frac{-2}{2}\right)^2 + 4} = 1 \pm \sqrt{5}$$

e) $2x^2 + 4x + 14 = 0$

$\Leftrightarrow\ x^2 + 2x + 7 = 0$

p = 2 q = 7

$x_{1,2} = -\frac{2}{2} \pm \sqrt{\left(\frac{2}{2}\right)^2 - 7} = -1 \pm \sqrt{-6}$

Dieses ist in R nicht möglich. Daraus folgt: Keine Lösung

f) $x^3 + 2x^2 - 8x = 0$

$\Leftrightarrow x(x^2 + 2x - 8) = 0$

$\Leftrightarrow\ x_1 = 0 \quad \vee \quad x^2 + 2x - 8 = 0$

p = 2 q = -8

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

$x_1 = 0 \ \vee \ x_2 = 2 \ \vee \ x_3 = -4$

g) $x^2 - 8x - 7 = 0$

p = -8 q = -7

$x_{1,2} = \frac{8}{2} \pm \sqrt{\left(\frac{8}{2}\right)^2 + 7} = 4 \pm \sqrt{23}$