ESERCIZI SULLE EQUAZIONI DI 2° GRADO A COEFFICIENTI IRRAZIONALI: CORREZIONI

73)

$$x^2+4=3x\sqrt{2} \quad x^2-3x\sqrt{2}+4=0$$

$$x_{1,2}=\frac{3\sqrt{2}\pm\sqrt{\left(3\sqrt{2}\right)^2-16}}{2}=\frac{3\sqrt{2}\pm\sqrt{18-16}}{2}=\frac{3\sqrt{2}\pm\sqrt{2}}{2}=\left\langle\begin{array}{l}\frac{2\sqrt{2}}{2}=\boxed{\sqrt{2}}\\ \frac{4\sqrt{2}}{2}=\boxed{2\sqrt{2}}\end{array}\right.$$

74)

$$2x\left(\sqrt{2}-x\right)=1 \quad 2x\sqrt{2}-2x^2=1 \quad -2x^2+2x\sqrt{2}-1=0 \quad 2x^2-2x\sqrt{2}+1=0$$

$$x_{1,2}=\frac{\sqrt{2}\pm\sqrt{2-2}}{2}=\frac{\sqrt{2}\pm0}{2}=\boxed{\frac{\sqrt{2}}{2}}$$

75)

$$\left(x\sqrt{3}-1\right)\left(2x\sqrt{3}-1\right)=0$$

Senza svolgere i calcoli,
dato che abbiamo già a primo membro una scomposizione in fattori
e il secondo membro è 0:

$$x\sqrt{3}-1=0, \quad x=\frac{1}{\sqrt{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}}=\boxed{\frac{\sqrt{3}}{3}}$$

$$2x\sqrt{3}-1=0, \quad x=\frac{1}{2\sqrt{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}}=\boxed{\frac{\sqrt{3}}{6}}$$

76)

$$9x^2+2\sqrt{3}=4$$

$$9x^2=4-2\sqrt{3}$$

$$x^2=\frac{4-2\sqrt{3}}{9}$$

$$x=\pm\sqrt{\frac{4-2\sqrt{3}}{9}}=\pm\frac{\sqrt{4-2\sqrt{3}}}{3}=\pm\frac{\sqrt{\left(\sqrt{3}-1\right)^2}}{3}=\boxed{\pm\frac{\sqrt{3}-1}{3}}$$

78)

$$9x^2+2\sqrt{3}=3$$

$$9x^2=3-2\sqrt{3}$$

$$x^2=\frac{3-2\sqrt{3}}{9} \quad \boxed{impossibile},$$

$$perch\grave{e}\ 3-2\sqrt{3}<0\ quindi\ anche\ \frac{3-2\sqrt{3}}{9}<0$$

81)

$$(x+4)\cdot\frac{x-4}{x-1}-2\cdot\frac{x+2\sqrt{6}}{1-x}=2$$

$$\frac{x^2-16}{x-1}+\frac{2x+4\sqrt{6}}{x-1}=2$$

$$x^2-16\cancel{+2x}+4\sqrt{6}=\cancel{2x}-2 \quad (x\neq 1)$$

$$x^2=14-4\sqrt{6}$$

$$x=\pm\sqrt{14-4\sqrt{6}}=\pm\sqrt{\left(2\sqrt{3}-\sqrt{2}\right)^2}=\boxed{\pm\left(2\sqrt{3}-\sqrt{2}\right)}$$

84)

$$2x^2-3x\left(1+\sqrt{2}\right)+\sqrt{2}=0 \quad \boxed{a=2 \quad b=-3\left(1+\sqrt{2}\right) \quad c=\sqrt{2}}$$

$$x_{1,2}=\frac{3\left(1+\sqrt{2}\right)\pm\sqrt{9\left(1+\sqrt{2}\right)^2-8\sqrt{2}}}{4}=\frac{3\left(1+\sqrt{2}\right)\pm\sqrt{9+18\sqrt{2}+18-8\sqrt{2}}}{4}=$$

$$=\frac{3\left(1+\sqrt{2}\right)\pm\sqrt{27+10\sqrt{2}}}{4}=\frac{3\left(1+\sqrt{2}\right)\pm\sqrt{\left(5+\sqrt{2}\right)^2}}{4}=\frac{3\left(1+\sqrt{2}\right)\pm\left(5+\sqrt{2}\right)}{4}=$$

$$=\left\langle\begin{array}{l}\dfrac{3\left(1+\sqrt{2}\right)-\left(5+\sqrt{2}\right)}{4}=\dfrac{3+3\sqrt{2}-5-\sqrt{2}}{4}=\dfrac{2\sqrt{2}-2}{4}=\dfrac{\cancel{2}\left(\sqrt{2}-1\right)}{\cancel{4}\,2}=\boxed{\dfrac{\sqrt{2}-1}{2}}\\ \dfrac{3\left(1+\sqrt{2}\right)+\left(5+\sqrt{2}\right)}{4}=\dfrac{3+3\sqrt{2}+5+\sqrt{2}}{4}=\dfrac{4\sqrt{2}+8}{4}=\dfrac{\cancel{4}\left(\sqrt{2}+2\right)}{\cancel{4}}=\boxed{\sqrt{2}+2}\end{array}\right.$$

87)

$$3x+\sqrt{3}(3x-5)=x^2+8 \qquad 3x+3x\sqrt{3}-5\sqrt{3}=x^2+8 \qquad -x^2+3x+3x\sqrt{3}-5\sqrt{3}-8=0$$

$$x^2-3x-3x\sqrt{3}+5\sqrt{3}+8=0 \qquad x^2-3x\left(1+\sqrt{3}\right)+\left(5\sqrt{3}+8\right)=0$$

$$x_{1,2}=\frac{3\left(1+\sqrt{3}\right)\pm\sqrt{9\left(1+\sqrt{3}\right)^2-4\left(5\sqrt{3}+8\right)}}{2}=\frac{3\left(1+\sqrt{3}\right)\pm\sqrt{9\left(1+2\sqrt{3}+3\right)-20\sqrt{3}-32}}{2}=$$

$$=\frac{3\left(1+\sqrt{3}\right)\pm\sqrt{4-2\sqrt{3}}}{2}=\frac{3\left(1+\sqrt{3}\right)\pm\sqrt{\left(\sqrt{3}-1\right)^2}}{2}=\frac{3+3\sqrt{3}\pm\left(\sqrt{3}-1\right)}{2}=\left\langle\begin{array}{l}\dfrac{2\sqrt{3}+4}{2}=\boxed{\sqrt{3}+2}\\ \dfrac{4\sqrt{3}+2}{2}=\boxed{2\sqrt{3}+1}\end{array}\right.$$

92)

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

$$3x^2\sqrt{2}+3x^2-x=2x$$

$$\cancel{3}x^2\sqrt{2}+\cancel{3}x^2-\cancel{3}x=0$$

$$x\left(x\sqrt{2}+x-1\right)=0$$

$$x\left[x\left(\sqrt{2}+1\right)-1\right]=0$$

$$x=\boxed{0} \quad \vee \quad x\left(\sqrt{2}+1\right)-1=0;$$

$$x=\frac{1}{\sqrt{2}+1}\cdot\frac{\sqrt{2}-1}{\sqrt{2}-1}=\frac{\sqrt{2}-1}{1}=\boxed{\sqrt{2}-1}$$