

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

73)

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

$$x_{1,2} = \frac{3\sqrt{2} \pm \sqrt{(3\sqrt{2})^2 - 16}}{2} = \frac{3\sqrt{2} \pm \sqrt{18-16}}{2} = \frac{3\sqrt{2} \pm \sqrt{2}}{2} = \begin{cases} \frac{2\sqrt{2}}{2} = \boxed{\sqrt{2}} \\ \frac{4\sqrt{2}}{2} = \boxed{2\sqrt{2}} \end{cases}$$

74)

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

$$x_{1,2} = \frac{\sqrt{2} \pm \sqrt{2-2}}{2} = \frac{\sqrt{2} \pm 0}{2} = \boxed{\frac{\sqrt{2}}{2}}$$

75)

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

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)

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

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

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

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

78)

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

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

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

perchè $3 - 2\sqrt{3} < 0$ quindi anche $\frac{3 - 2\sqrt{3}}{9} < 0$

81)

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

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

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

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

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

84)

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

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

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

$$= \begin{cases} \frac{3(1+\sqrt{2}) - (5+\sqrt{2})}{4} = \frac{3+3\sqrt{2}-5-\sqrt{2}}{4} = \frac{2\sqrt{2}-2}{4} = \frac{\cancel{2}(\sqrt{2}-1)}{\cancel{4}^2} = \boxed{\frac{\sqrt{2}-1}{2}} \\ \frac{3(1+\sqrt{2}) + (5+\sqrt{2})}{4} = \frac{3+3\sqrt{2}+5+\sqrt{2}}{4} = \frac{4\sqrt{2}+8}{4} = \frac{\cancel{4}(\sqrt{2}+2)}{\cancel{4}} = \boxed{\sqrt{2}+2} \end{cases}$$

87)

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

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

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

$$= \frac{3(1+\sqrt{3}) \pm \sqrt{4-2\sqrt{3}}}{2} = \frac{3(1+\sqrt{3}) \pm \sqrt{(\sqrt{3}-1)^2}}{2} = \frac{3+3\sqrt{3} \pm (\sqrt{3}-1)}{2} = \begin{cases} \frac{2\sqrt{3}+4}{2} = \boxed{\sqrt{3}+2} \\ \frac{4\sqrt{3}+2}{2} = \boxed{2\sqrt{3}+1} \end{cases}$$

92)

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

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

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

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

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

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

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