

## EQUAZIONI DI PRIMO GRADO

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(A.S. 2014/2015)

$$\bullet \frac{6x+3}{(x-2)^2} + \frac{20x-32}{4x} = 6 + \frac{1-x^2}{x(x-2)}; \quad \text{C.E.: } \begin{matrix} x \neq 2 \\ x \neq 0 \end{matrix}$$

$$\frac{6 \cdot x+3}{(x-2)^2} + \frac{4(5x-9)}{4x} = 6 + \frac{1-x^2}{x(x-2)} \quad \text{mcm} = x(x-2)^2$$

$$6x^2+3x+3(x-2)^2(5x-9) = 6x(x-2)^2 + (1-x^2)(x-2);$$

$$6x^2+3x+(x^2-4x+4)(5x-9) = 6x(x^2-4x+4) + x-2-x^3+2x^2;$$

$$6x^2+3x+(x^2-4x+4)(5x-9) = 6x^3-24x^2+24x+x-2-x^3+2x^2;$$

$$6x^2+3x+5x^3-20x^2+20x-9x^2+32x+32 = 6x^3-24x^2+24x+x-2-x^3+2x^2$$

$$227) \frac{x^5}{8} + 2 = 5\left(\frac{18}{7} - x\right) + 2x + \frac{108}{5} + \frac{115}{7};$$

$$6 = \frac{90}{7} - 5x + 2x + \frac{108}{5} + \frac{115}{7};$$

$$3x = -6 + \frac{90}{7} + \frac{108}{5} + \frac{115}{7};$$

$$3x = \frac{-210+450+756+575}{35};$$

$$3x = \frac{1571}{35}; \quad x = \frac{1571}{105}$$

$$237) \frac{3x(10-2x) - 2x(5+2x) + 2(x-3)^2}{5} = 0;$$

$$\frac{30x - 6x^2 - 10x - 4x^2 + 2(x^2 - 6x + 9)}{5} = 0;$$

$$\frac{30x - 6x^2 - 10x - 4x^2 + 2x^2 - 12x + 18}{5} = 0;$$

$$30x - 6x^2 - 10x - 4x^2 + 2x^2 - 12x + 18 = 0;$$

$$-40x = -90; \quad 40x = 90; \quad x = \frac{9}{4}$$

$$247) 4\left\{\frac{x}{2} + \frac{5}{9}\left(x + \frac{1}{9}\right) - \left[4\left(x + \frac{1}{9}\right) + 2\left(x - \frac{1}{9}\right)\right] \frac{1}{8}\right\} = 4x + 1;$$

$$4\left\{\frac{x}{2} + \frac{5}{9}x + \frac{5}{16} - \left[4x + 1 + 2x - \frac{1}{2}\right] \frac{1}{8}\right\} = 4x + 1;$$

$$4\left\{\frac{x}{2} + \frac{5}{9}x + \frac{5}{16} - \frac{1}{2}x - \frac{1}{8} - \frac{1}{9}x + \frac{1}{16}\right\} = 4x + 1;$$

$$2x + \frac{5}{9}x + \frac{5}{4} - \frac{1}{2}x - \frac{1}{2} - \frac{1}{9}x + \frac{1}{4} = 4x + 1;$$

$$0x = 1 - \frac{5}{4} + \frac{1}{2} + \frac{1}{4};$$

$$0x = \frac{4 - 5 + 2 - 1}{4};$$

$$0x = \frac{0}{4}; 0x = 0; x = 0; \text{INDETERMINATA}$$

$$257) \frac{2}{3} \left[ \left( \frac{1}{2} - x \right)^2 - \left( \frac{1}{2} + x \right)^2 \right] + \left( x - \frac{1}{3} \right)^2 - x^2 = \left( \frac{3}{2-x} \right)^{-1};$$

$$\frac{2}{3} \left[ \left( \frac{1}{4} - x + x^2 \right) - \left( \frac{1}{4} + x + x^2 \right) \right] + \left( x^2 - \frac{2}{3}x + \frac{1}{9} \right) - x^2 = \frac{2-x}{3};$$

$$\frac{2}{3} [-2x] - \frac{2}{3}x + \frac{1}{9} = \frac{2-x}{3};$$

$$-\frac{4x}{3} - \frac{2x}{3} + \frac{1}{9} = \frac{2-x}{3};$$

$$-12x - 6x + 1 = 6 - 3x;$$

$$-12x - 6x + 3x = 6 - 1;$$

$$-15x = 5; 15x = -5; x = -\frac{5}{15}; x = -\frac{1}{3}$$

$$335) \frac{x}{x-1} + 5 = 2;$$

$$x + (x-1)5 = (x-1)2;$$

$$x + 5x - 5 = 2x - 2;$$

$$x + 5x - 2x = 5 - 2;$$

$$4x = 3; x = \frac{3}{4}$$

$$340) \frac{1}{2x+6} - \frac{1}{2} = \frac{4}{3x+9}; \text{ m.c.m.} = 6(x+3)$$

$$\frac{1}{2(x+3)} - \frac{1}{2} = \frac{4}{3(x+3)};$$

$$3 - 3(x+3) = 2 \cdot 4;$$

$$3 - 3x - 9 = 8;$$

$$-3x = 8 - 3 + 9;$$

$$-3x = 14; 3x = -14; x = -\frac{14}{3}$$

$$345) \frac{3-x}{2x} = \frac{5+2x}{3x}; \text{ m.c.m.} = x \neq 0, \text{ m.c.m.} = 6x$$

$$3(3-x) = 2(5+2x);$$

$$9 - 3x = 10 + 4x;$$

$$-3x - 4x = 10 - 9;$$

$$-7x = 1; 7x = -1; x = -\frac{1}{7}$$

$$350) \frac{2(x+4)}{x-1} + \frac{x+3}{1-x} = 2;$$

$$\frac{2(x+4)}{x-1} - \frac{x+3}{x-1} = 2;$$

$$2(x+4) - x - 3 = 2(x-1);$$

$$2x + 8 - x - 3 = 2x - 2;$$

$$-x = -8 + 3 - 2;$$

$$-x = -7; x = 7$$

$$355) \frac{4}{3x} = \frac{1}{x+1}; \quad \text{C.E.: } x \neq -1, x \neq 0$$

$$4(x+1) = 3x; \quad \text{mcm} = 3x(x+1)$$

$$4x+4 = 3x;$$

$$4x-3x = -4;$$

$$x = -4$$

$$360) \frac{2}{x-1} + \frac{x-3}{3x-3} - \frac{1}{3} = \frac{1}{3x-2}; \quad \text{C.E.: } x \neq 1, x \neq 2/3$$

$$\frac{2}{x-1} + \frac{x-3}{3(x-1)} - \frac{1}{3} = \frac{1}{3x-2}; \quad \text{mcm: } 3(x-1)(3x-2)$$

$$6(3x-2) + (x-3)(3x-2) - (x-1)(3x-2) = 3(x-1);$$

$$18x-12 + 3x^2 - 2x - 9x + 6 - 3x^2 + 2x + 3x - 2 = 3x - 3;$$

$$18x - 9x = -3 + 12 - 6 + 2;$$

$$9x = 5; \quad x = \frac{5}{9}$$

$$365) \frac{-1-x}{x+2} + \frac{2}{x^2-4} = \frac{x+1}{x-2} - 2; \quad \text{C.E.: } x \neq \pm 2$$

$$\frac{-(1+x)}{x+2} + \frac{2}{(x+2)(x-2)} = \frac{x+1}{x-2} - 2;$$

$$\text{mcm} = (x+2)(x-2)$$

$$(-1-x)(x-2) + 2 = (x+1)(x+2) - 2(x+2)(x-2);$$

$$-x+2-x^2+2x+2 = x^2+2x+1x+2-2(x^2-4);$$

$$-x+2-x^2 = x^2+x-2x^2+8;$$

$$-2x = 8-2; \quad -2x = 6; \quad 2x = -6; \quad x = -3$$

$$370) \frac{5}{x+1} + \frac{4}{1-x^2} = \frac{3}{2x-2}; \quad \text{C.E.: } x \neq \pm 1$$

$$\frac{5}{x+1} + \frac{4}{(1+x)(1-x)} = \frac{3}{2(x-1)};$$

$$\text{mcm: } 2(x+1)(x-1)$$

$$10(x-1) - 8 = 3(x+1);$$

$$10x - 10 - 8 = 3x + 3;$$

$$10x - 3x = 3 + 10 + 8;$$

$$7x = 21; \quad x = \frac{21}{7}; \quad x = 3$$

Michele ha vinto 2345 euro al lotto. Devolve parte della vincita a una associazione umanitaria, mentre trattiene per sè una somma pari ai  $\frac{3}{4}$  di quanto elargito. Quanti soldi ha donato Michele all'associazione?

Soluzione

$$\begin{array}{l} D \left\{ \begin{array}{l} 2345 = \text{€ vinti} \\ x = \text{PARTE DONATA} \\ \frac{3}{4}x = \text{PARTE TENUTA} \end{array} \right. \quad x = ? \end{array}$$

$$x = 2345 - \frac{3}{4}x;$$

$$x + \frac{3}{4}x = 2345;$$

$$4x + 3x = 9380;$$

$$7x = 9380; \quad x = 1340$$

Il padre di Andrea ha 30 anni più di lui. Sapendo che i due hanno complessivamente 100 anni, determina le età di Andrea e di suo padre.

Soluzione

$$\begin{cases} \text{ANNI ANDREA} = x \\ \text{" PAPA' " } = 30 + x \\ \text{TOTALE ANNI} = (30 + x) + x = 100 \text{ anni} \end{cases}$$

$$30 + x + x = 100;$$

$$30 + 2x = 100;$$

$$2x = 100 - 30;$$

$$2x = 70;$$

$$x = 35$$

Andrea = 35 anni  
Papa' " = 65 anni

Lisa vorrebbe sistemare tutti i suo 74 CD musicali in due porta CD uno più grande, da tenere in casa, e uno più piccolo da tenere in automobile. Se vuole che il porta CD che ha in casa contenga esattamente il doppio dei CD da tenere in auto, può riuscire nel suo intento? Perché?

Soluzione

$$\begin{array}{l} D \left\{ \begin{array}{l} n \cdot \text{CD} = 74 \\ x = \text{CD in AUTO} \\ 2x = \text{CD in CASA} \end{array} \right. \quad \text{Può sistemarli così?} \end{array}$$

$$2x + x = 74;$$

$$3x = 74;$$

$$x = \frac{74}{3}; \quad x = 24,6 \notin \mathbb{N} \quad \text{Non accettabile}$$

$$341) \frac{1}{3x} - 5 + \frac{1}{6x} = 0$$

$$\text{C.E.: } x \neq 0$$

$$\text{mem: } 6x$$

$$2 - 30x + 1 = 0$$

$$-30x = -2 - 1;$$

$$30x = 3; x = \frac{1}{10} \quad \text{ACCETTABILE}$$

$$346) \frac{5}{x} + \frac{x}{5} = \frac{x^2 - 25}{5x}$$

$$\text{C.E.: } x \neq 0$$

$$\text{mem} = 5x$$

$$25 + \cancel{x} = \cancel{x} - 25$$

$$0x = 0 \quad \text{IMPOSSIBILE}$$

$$351) \frac{4x+1}{6-x} + 1 = \frac{2-x}{x-6}$$

$$\text{C.E.: } x \neq 6$$

$$\text{mem} = 6-x$$

$$4x+1+6-x = -2+x;$$

$$4x-x-x = -2-1-6;$$

$$2x = -9; x = -\frac{9}{2} \quad \text{ACCETTABILE}$$

$$356) \frac{7}{x-1} - \frac{5}{x+1} = 0$$

$$\text{C.E.: } x \neq \pm 1$$

$$\text{mem: } (x+1)(x-1)$$

$$7(x+1) - 5(x-1) = 0;$$

$$7x+7-5x+5=0;$$

$$2x = -12; x = -\frac{12}{2}; x = -6 \quad \text{ACCETTABILE}$$

$$361) \frac{2}{\frac{1}{5}+x} + \frac{3}{\frac{1}{5}-x} = 0;$$

$$\text{I}=2$$

$$\text{C.E.: } x \neq \pm \frac{1}{5}$$

$$\text{mem: } \left(\frac{1}{5}+x\right)\left(\frac{1}{5}-x\right)$$

$$2\left(\frac{1}{5}-x\right) + 3\left(\frac{1}{5}+x\right) = 0;$$

$$\frac{2}{5} - 2x + \frac{3}{5} + 3x = 0;$$

$$x = -\frac{1}{5}; x = -1 \quad \text{ACCETTABILE}$$

$$366) \frac{11}{x^2-4} + \frac{6}{2-x} = \frac{1}{2+x};$$

$$C.E.: x \neq \pm 2$$

$$\text{mem: } (2+x)(2-x)$$

$$\frac{11}{(x+2)(x-2)} + \frac{6}{2-x} = \frac{1}{2+x};$$

$$-11 + 6(2+x) = 2-x;$$

$$-11 + 8 + 6x = 2-x;$$

$$+6x + x = +11 - 8 + 2;$$

$$5x = 5; x = 1 \quad \text{ACCETTABILE}$$

$$371) \frac{x^2}{7x^2-7x} = \frac{x(x-5)}{7x^2-7} - \frac{6}{7x+7}; \quad C.E.: x \neq \pm 1; x \neq 0$$

$$\text{mem: } 7x(x+1)(x-1)$$

$$\frac{x^2}{7x(x-1)} = \frac{x(x-5)}{7(x-1)(x+1)} - \frac{6}{7(x+1)};$$

$$x^2(x+1) = x^2(x-5) - 6x(x-1);$$

$$\cancel{x^3} + x^2 = \cancel{x^3} - 5x^2 - 6x^2 + 6x;$$

$$x^2 + 5x^2 + 6x^2 - 6x = 0;$$

$$12x^2 - 6x = 0$$

$$6x = 0; x = 0/6; x = 0 \quad \text{NON ACCETTABILE PER IL C.F.}$$

$$6x(2x-1) = 0 \begin{cases} 2x-1 = 0; 2x = 1; x = \frac{1}{2} \quad \text{ACCETTABILE} \end{cases}$$

$$376) \frac{7(y-1)(y+1)}{(y-1)^2} - \frac{6}{(y-1)^2} = \frac{7}{(y-1)};$$

$$C.E.: y \neq 1$$

$$\text{mem} = (y-1)^2$$

$$7(y+1) - 6 = 7(y-1);$$

$$\cancel{7y} + 7 - 6 = \cancel{7y} - 7;$$

$$0x = -18; \text{IMPOSSIBILE}$$

$$546) x + \frac{3}{7}x = 90;$$

$$I^\circ \text{ ANGOLO} = 63^\circ$$

$$7x + 3x = 630;$$

$$II^\circ \text{ ANGOLO} = \frac{3}{7} \cdot 63^\circ; 27^\circ$$

$$10x = 630;$$

$$x = 63^\circ.$$