

### I) Fractions :

$$A = \frac{4}{5} - \frac{2}{5} \left( \frac{1}{3} - 3 \right)$$

$$B = \frac{2}{a} - \frac{7}{5} \times \frac{1}{\frac{a}{4} - \frac{a}{2}}$$

$$C = \frac{\frac{3}{2} - 1}{1,5 + 1} \times \frac{5^3}{18}$$

$$D = a^{-2} + \frac{\left( \frac{1}{2a} + \frac{1}{a} \right)^2}{\frac{5}{4}}$$

$$E = \frac{\frac{7}{6} - \frac{a}{3}}{1 - \frac{4a}{14}} \times \frac{a^2}{7}$$

$$F = \frac{2+3}{2+7} \div \left( \frac{5}{3} \right)^2$$

$$G = \frac{7}{18} \times \frac{2}{7} - \left( \frac{5}{3} - 1 \right)^2 + 1$$

$$H = \left( \frac{2}{5} - \frac{3}{4} \right)^2 \div \frac{5}{8} - \frac{8}{3}$$

$$I = \frac{a}{3} - \frac{a}{3} \times \frac{7}{21} - \frac{7}{21}$$

$$J = \frac{\frac{3}{4} - \frac{2}{3}}{\frac{4}{3} + \frac{2}{5}} \div \frac{\frac{4}{5} - \frac{3}{4}}{\frac{4}{5} + \frac{3}{4}}$$

$$K = \frac{a + \frac{a}{3} - \frac{a}{2}}{2a + \frac{3a}{4} + \frac{a}{3}}$$

$$L = \frac{-5 + 3^2 \times 2 + 4}{12 \times 2 + 10}$$

$$M = \frac{2}{a+1} + \frac{1 - \frac{1}{a}}{1 + \frac{1}{a}}$$

### II) Puissances :

$$A = \frac{49 \times (-2)^5 \times (-3)^{-2}}{-7^3 \times 16 \times 3^{-3}}$$

$$B = \frac{(-5)^4 \times 7^2 \times (-2)^{-3}}{(-4)^4 \times (-1)^5 \times 25}$$

$$C = \left( \frac{(a^2 b^4)^2}{a^3} \right)^{-3}$$

$$D = 0,0000000005 \times 1004000000$$

$$E = \frac{2^3}{3^4} \div \frac{2^2}{3^5}$$

$$F = \frac{(a^2 b)^3}{(-a)(-b)^2}$$

$$G = \left( \frac{4^{-2} \times 8^4}{90^7 \times 30^{-2}} \right)^3$$

$$H = \left( \frac{5^5 \times 24^{-3}}{(100^{-7} \times 15^6)^4} \right)^2$$

$$I = \frac{2^2 \times 10^{-10} \times 2^7 \times 10^{-6}}{32 \times 10^{-15}}$$

$$J = \left( \frac{a^3 b^{-2}}{a^4 b^{-3}} \right)^{-2} \times \frac{(3a^2 b^3)^3}{(2^{-1} ab)^2}$$

$$K = \frac{5^3 \times 3^8 \times 5^2}{125 \times 5^2 \times 81 \times 7^0}$$

$$L = \frac{0,9 \times 7 \times 10^{-1} \times 250}{14 \times 10^3 \times 0,5 \times 10^{-2}}$$

$$M = \frac{(56^8 \times 81^{-2} \times 25^7)^3}{(50^5 \times 700^3)^4}$$

$$N = \frac{0,04 \times 2^{-2} \times (10^{-2})^3 \times 10^2}{3 \times 10^{-8} \times 10^{-2}}$$

$$O = \frac{25 \times (10^2)^{-5} \times 121}{11 \times 75 \times 10^{-9}}$$

$$P = \frac{9^{n+1} + 9^n}{3^{2n+1} - 3^{2n}} \quad (n \in \mathbb{N})$$

$$Q = \frac{(ab^2)^2 (ab^{-1})^3 (a^2 b)^{-2}}{a^2 c^{-5} (a^{-1} bc^2)^3}$$

$$R = \frac{(ab^{-2} c^3)^4 (a^4 b^5 c^{-6})^{-2}}{(a^{-7} b^8 c^7)^3 (a^6 b^5 c^4)^2}$$

### III) Racines :

$$A = \sqrt{2} + 3\sqrt{8} - 6\sqrt{50}$$

$$B = \sqrt{2} + \sqrt{\frac{1}{2}} - \sqrt{\frac{1}{8}}$$

$$C = \frac{\sqrt{3}}{\sqrt{3}-2}$$

$$D = \frac{2\sqrt{21}\sqrt{75}a^2}{\sqrt{35}\sqrt{20}}$$

$$E = \left( \frac{\sqrt{10-2\sqrt{5}}}{4} \right)^2 + \left( \frac{1+\sqrt{5}}{4} \right)^2$$

$$F = (\sqrt{2} + \sqrt{7})^3$$

$$G = (2a + \sqrt{b})^2 + (1 - 2a\sqrt{b})^2 - (2a\sqrt{b})^2$$

$$H = \frac{\sqrt{3}}{\sqrt{3} - \frac{2}{\sqrt{3}}}$$

$$I = \frac{3\sqrt{5} + \sqrt{20}}{\sqrt{45} \left( 2 - \frac{5}{6} + \frac{4}{3} \right) (1 - \sqrt{3})}$$

$$J = (4 + 3\sqrt{2})^2 - (2 + \sqrt{2})(\sqrt{2} - 1)$$

$$K = \sqrt{\frac{7+4\sqrt{3}}{7-4\sqrt{3}}} + \sqrt{\frac{7-4\sqrt{3}}{7+4\sqrt{3}}}$$

$$L = \frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}} + \frac{\sqrt{3} - \sqrt{2}}{\sqrt{3} + \sqrt{2}}$$

$$M = \frac{\sqrt{0,04}}{\sqrt{0,0016}} + \frac{\sqrt{0,01}}{\sqrt{0,04}}$$

$$N = (\sqrt{2} - \sqrt{2} + \sqrt{2} + \sqrt{2})^2$$

$$O = \sqrt{\frac{a^6 + a^6 + a^6 + a^6}{5^2 + 5^2 + 5^2 + 5^2}}$$

$$P = \sqrt{6 - \sqrt{6 - \sqrt{6 - \sqrt{6 - \sqrt{\frac{4\sqrt{27}}{3\sqrt{3}}}}}}}}$$

$$Q = \sqrt{\frac{48a^6 b^{12}}{243(ab)^4}}$$

$$R = \sqrt{\frac{4^{80} + 5 \times 8^{53}}{28 \times 2^{155}}}$$

$$S = (\sqrt{1 + \sqrt{1 - a^2}} + \sqrt{1 - \sqrt{1 - a^2}})^2 \quad (a \in [0; 1])$$

### IV) Factorisations :

$$A = x^2 - 9 - (2x - 6)x + (x - 3)^2$$

$$B = (x - 11)^2 + (33 - 3x)(x + 2)$$

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

$$D = -0,3(2x - 3)^2 + 0,7x(1,5 - x)$$

$$E = 0,25x^2 - x + 1$$

$$F = x^2 - 3x + 2$$

$$G = -9x^2 - 6x - 1$$

$$H = -10 + (x + 5)^2 - 2x$$

$$I = -2x^2 + x + 1$$

$$J = x^2 + 2\sqrt{2}x + 2$$

$$K = x^2 - 2$$

$$L = 4x^2 - 12x + 8$$

$$M = x - (3x - 1)^3 + 2x - 1$$

$$N = (2x - 1)x + (1 - 2x)^2 + \left( x - \frac{1}{2} \right) \left( x - \frac{3}{2} \right)$$

$$O = x^2 \left( 1 + \frac{1}{x} \right) + 2(x + 1)^2$$

$$P = x^2 - (x + 1)^2$$

$$Q = 5(1 - x)^2 - 45x^2$$

$$R = (x + 1)^2 - 2(x + 1) + 1$$

$$S = x^5 + 4x^4 + 4x^3$$

$$T = (5x - 1)(x + 3) + 3(25x^2 - 1)$$

$$U = 49 - 28x + 4x^2 + (7 - 2x)(5 - 3x)$$

$$V = x^2(x - 4) + 2x(x - 4) + x - 4$$

$$W = x^2 + 6x + 5$$

$$X = 3x^2 + 7x + 2$$

$$Y = -2x^2 - x + 1$$

$$Z = 2x^2 - 3x + 1$$