



$$15^\circ. \sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}} = \beta$$

$$\beta^2 = 6 \Rightarrow \beta = \sqrt{6}$$

$$16^\circ. \frac{3\sqrt{8} - 2\sqrt{12} + \sqrt{20}}{3\sqrt{18} - 2\sqrt{27} + \sqrt{45}} = 2/3$$

I. Calculs élémentaires.

$$1^\circ. 2 - 7 - (8 - 5 + (5 - 2 + 4) - (6 - 1 + 3)) = -7$$

$$2^\circ. (-3 + 5 + 8 - 4)(2 - 7 - 6) = -66$$

$$3^\circ. \frac{1}{3} + \frac{1}{5} = \frac{8}{15}$$

$$4^\circ. \frac{5}{3} - \frac{1}{2} + \frac{4}{7} = \frac{73}{42}$$

$$5^\circ. 1 - \left(\frac{3}{4} - \frac{2}{3}\right) - \left(1 - \left(\frac{5}{3} - \frac{1}{4}\right)\right) - \left(1 - \left(\frac{4}{3} + \frac{3}{4}\right)\right) = \frac{29}{12}$$

$$6^\circ. \frac{2 + \frac{1}{2+1/3}}{2 - \frac{1}{3-1/5}} = \frac{34}{23}$$

II. Puissances.

$$1^\circ. (-3)^4 \times (-3)^5 \times \frac{(-3)^4}{(-3)^6} \times ((-3)^{-2})^{-1} = (-3)^9 = -19683$$

$$2^\circ. \frac{(3^2 \times 7^5)^{-3}}{(7^2 \times 3^{-3})^2} \times \left(\frac{(7 \times 3)^2}{3^2 \times 7}\right)^3 = 7^{-16}$$

$$3^\circ. \left(\frac{2 \times 10^{-5}}{(20 \times 5^2)^3}\right)^{-2} \times \left(\frac{((2^3)^4)^{-2} \times 5^3}{25^{-1} \times 1250}\right) = 5^{23} 2^{-5}$$

$$4^\circ. \frac{\frac{(-3)^2 \times (-2)^3 \times (-6^2)}{(-12)^4 \times (-18)^{-2}}}{\frac{4^{-3} \times (-3)^{-2} \times 12}{9^3}} = 1417176$$

$$5^\circ. \frac{10^2 + 10^{-2}}{10^{-2}} = 10001$$

$$6^\circ. \frac{4 \times 10^{-3} - 25 \times 10^{-5}}{12 \times 10^{-5}} = \frac{375}{12}$$

III. Racines carrées

$$1^\circ. 2\sqrt{20} + 3\sqrt{5} - 2\sqrt{45} = \sqrt{5}$$

$$2^\circ. 4\sqrt{27} - 5\sqrt{48} + 4\sqrt{12} = 0$$

$$3^\circ. 2\sqrt{3} \times 6\sqrt{3} = 36$$

$$4^\circ. \sqrt{90} \times \sqrt{735} \times \sqrt{66} = 30\sqrt{11}$$

$$5^\circ. \sqrt{112} \times \sqrt{567} = 252$$

$$6^\circ. (\sqrt{2} + \sqrt{3})^2 = 5 + 2\sqrt{6}$$

$$7^\circ. \left(\frac{-\sqrt{2}}{3\sqrt{3}}\right)^2 = 2/27$$

$$8^\circ. \frac{2}{\sqrt{6} - \sqrt{5}} = 2(\sqrt{6} + \sqrt{5})$$

$$9^\circ. \frac{3 + \sqrt{2}}{3\sqrt{2} - 3} = (5 + 4\sqrt{2})/3$$

$$10^\circ. \frac{\sqrt{2} + 3}{3\sqrt{2} - 3} = (-15 + 12\sqrt{2})/7$$

$$11^\circ. \frac{1 + \sqrt{3}}{2 - \sqrt{3}} - \frac{1 - \sqrt{3}}{2 + \sqrt{3}} = 6\sqrt{3}$$

$$12^\circ. \sqrt{7 - \sqrt{5}} \times \sqrt{7 + \sqrt{5}} = 2\sqrt{11}$$

$$13^\circ. \sqrt{7 - \sqrt{5}} + \sqrt{7 + \sqrt{5}} = \alpha$$

$$\alpha^2 = 14 + 4\sqrt{11} \Rightarrow \alpha = \sqrt{14 + \sqrt{11}}$$

$$14^\circ. \sqrt{2 + \sqrt{3}} \times \sqrt{2 - \sqrt{3}} = 1$$