exponent progression

$x^n = \alpha$

$x^n - 2 = \beta$ with terms

$\alpha x^a = 4$ with coefficients

$\alpha x^a - 4 = \beta$ combined

$4x^a x^b - \alpha = 2$ adding exponents

$\frac{x}{2x^a} - \beta = 1$ subtracting exponents

$4(\alpha x^n)^2 + (x^2)^n = 1$ expand/reverse brackets

$(2\sqrt[n]{x})^\alpha - x^{\frac{\alpha}{n}} = \beta$ include radicals

$\sqrt{x^2 - \alpha^2} = \alpha x$ trick questions

exponents with letters

$$x^n = \alpha$$

$$x^n + 4 = \beta$$

$$x^{-n} - n = \alpha$$

$$\alpha x^{a} = 4$$

$$\beta x^{b} - 4 = \alpha$$

$$\alpha x^{\alpha} - 1 = \beta$$

$$\frac{\alpha^n - x^n}{4} + 2 = \alpha$$

$$\frac{4x^n - 4(x^n - \alpha)}{x^\alpha} + 2 = \beta$$

$$\frac{x^n - \alpha}{\alpha} + \beta = \epsilon(1-\Gamma)^n$$

$$\frac{x(1-x^2)}{2x} + \alpha x^2 = \epsilon$$

$$x^{a}x^{2} + 2 = 4$$

$$\frac{x^{n}x^{-n}}{2} + 4x^{\alpha} = \epsilon$$

$$\frac{x^a x^n x}{4-\alpha} + \Gamma(\alpha-1)^n = 2$$

$$\frac{x^m x}{x} + 2 = \epsilon$$

$$\frac{x^n(1-\alpha)}{\beta(1+\alpha)} + 2 = \epsilon$$

$$\frac{x^n x^2}{x} + 4 = \sum_{i=1}^{n} r_i^2$$

$$\frac{x^n}{x^m(1-\alpha)} + 4 = \epsilon$$

$$\frac{x^2(1-\epsilon)}{x^\alpha(1+\epsilon)} = \eta$$

$$(2x)^2 + x^2 = \alpha$$

$$\left[(\alpha - 1)x\right]^n - 4 = \epsilon$$

$$[\alpha x]^n - x^n = 18$$

$$[(\alpha - 1)x^2]^n - [2x^n]^2 = \gamma$$

$$\left[\frac{\alpha x^2}{x^a}\right]^b = \epsilon$$

$$\sqrt{x^a} = 4$$

$$\left[\frac{x^{\frac{1}{2}}\sqrt{x}}{x}\right]^2 - x = 0$$

$$\left[\sqrt[3]{x^{\alpha}}\; x^{\frac{3}{\alpha}}\right]^2 + \epsilon = 8$$

$$\left[2\sqrt[3]{x^{\alpha}}\right]^{\frac{3}{\alpha}} - x = 4$$

$$\sqrt{x^2 - \alpha^2} = \alpha x$$

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

$$\sqrt{(4-x)^2 + 4^2} = \epsilon + 1$$

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exponents with letters

$$\left(x^{n}\right)^{\frac{1}{n}} = \left(\alpha\right)^{\frac{1}{n}}$$

$$x = \alpha^{\frac{1}{n}}$$

$$x^{n} + 4^{\,-4} = \beta^{\,-4}$$

$$\left(x^{n}\right)^{\frac{1}{n}} = \left(\beta - 4\right)^{\frac{1}{n}}$$

$$x = \left[\beta - 4\right]^{\frac{1}{n}}$$

$$x^{-n} - n^{+n} = \alpha^{+n}$$

$$\left(x^{-n}\right)^{\frac{1}{-n}} = \left(\alpha + n\right)^{\frac{1}{-n}}$$

$$\boxed{x = \left(\alpha + n\right)^{-\frac{1}{n}} = \frac{1}{\sqrt[n]{\alpha + n}}}$$

$$\frac{\alpha x^a}{\alpha} = \frac{4}{\alpha}$$

$$\left(x^a\right)^{\frac{1}{a}} = \left(\frac{4}{\alpha}\right)^{\frac{1}{a}}$$

$$x = \left(\frac{4}{\alpha}\right)^{\frac{1}{a}}$$

$$\beta x^b - 4^{+4} = \alpha^{+4}$$

$$\frac{\beta x^b}{\beta} = \frac{\alpha + 4}{\beta}$$

$$\left(x^b\right)^{\frac{1}{b}} = \left(\frac{\alpha + 4}{\beta}\right)^{\frac{1}{b}}$$

$$\boxed{x = \left(\frac{\alpha + 4}{\beta}\right)^{\frac{1}{b}}}$$

$$\alpha x^\alpha - 1^{+1} = \beta^{+1}$$

$$\frac{\alpha x^\alpha}{\alpha} = \frac{\beta + 1}{\alpha}$$

$$\left(x^\alpha\right)^{\frac{1}{\alpha}} = \left(\frac{\beta + 1}{\alpha}\right)^{\frac{1}{\alpha}}$$

$$\boxed{x = \left(\frac{\beta + 1}{\alpha}\right)^{\frac{1}{\alpha}}}$$

$$\frac{\alpha^n - x^n}{4} + 2^{-2} = \alpha^{-2}$$

$$4\left(\frac{\alpha^n - x^n}{4}\right) = \left(\alpha - 2\right)4$$

$$\alpha^{n\,-\alpha^n} - x^n = 4\left(\alpha - 2\right)^{-\alpha^n}$$

$$(-1)\left(-x^n\right) = \left(4\left(\alpha - 2\right) - \alpha^n\right)^{(-1)}$$

$$\left(x^n\right)^{\frac{1}{n}} = \left(\alpha^n - 4\left(\alpha - 2\right)\right)^{\frac{1}{n}}$$

$$\boxed{x = \left[\alpha^n - 4\left(\alpha - 2\right)\right]^{\frac{1}{n}}}$$

$$\frac{4x^n - 4\left(x^n - \alpha\right)}{x^\alpha} + 2^{-2} = \beta^{-2}$$

$$x^\alpha\left(\frac{4x^n - 4x^n + 4\alpha}{x^\alpha}\right) = \left(\beta - 2\right)x^\alpha$$

$$4\alpha = \left(\beta - 2\right)x^\alpha$$

$$\left(x^\alpha\right)^{\frac{1}{\alpha}} = \left(\frac{4\alpha}{\beta - 2}\right)^{\frac{1}{\alpha}}$$

$$\boxed{x = \left[\frac{4\alpha}{\beta - 2}\right]^{\frac{1}{\alpha}}}$$

$$\frac{x^n - \alpha}{\alpha} + \beta \overset{-\beta}{=} \epsilon(1-\Gamma)^n \; {}^{-\beta}$$

$$\alpha\left(\frac{x^n - \alpha}{\alpha}\right) = \left(\epsilon(1-\Gamma)^n - \beta\right)\alpha$$

$$x^n - \alpha \overset{+\alpha}{=} \alpha\epsilon(1-\Gamma)^n - \alpha\beta \; {}^{+\alpha}$$

$$\left(x^n\right)^{\frac{1}{n}} = \left(\alpha\epsilon(1-\Gamma)^n - \alpha\beta + \alpha\right)^{\frac{1}{n}}$$

$$\boxed{x = \left[\alpha\epsilon(1-\Gamma)^n - \alpha\beta + \alpha\right]^{\frac{1}{n}}}$$

$$2\left(\frac{\cancel{x}(1-x^2)}{2\cancel{x}} + \alpha x^2\right) = (\epsilon)2$$

$$1 \overset{-1}{-} x^2 + 2\alpha x^2 = 2\epsilon \; {}^{-1}$$

$$\left(2\alpha x^2 - x^2\right) = 2\epsilon - 1$$

$$x^2(2\alpha - 1) = 2\epsilon - 1$$

$$\left(x^2\right)^{\frac{1}{2}} = \left(\frac{2\epsilon - 1}{2\alpha - 1}\right)^{\frac{1}{2}}$$

$$\boxed{x = \pm\left(\frac{2\epsilon - 1}{2\alpha - 1}\right)^{\frac{1}{2}}}$$

$$\overbrace{x^{a}x^{2}}^{a+2} + 2^{-2} = 4^{-2}$$

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

$$\boxed{x = 2^{\frac{1}{2+a}}}$$

$$\frac{\overbrace{x^{n}x^{-n}}^{=0}}{2} + 4x^{\alpha} = \epsilon$$

$$2\left(\frac{\cancel{x^{0}}^{\,1}}{2} + 4x^{\alpha}\right) = \left(\epsilon\right)2$$

$$1^{-1} + 8x^{\alpha} = 2\epsilon^{-1}$$

$$8x^{\alpha} = 2\epsilon - 1$$

$$\left(x^{\alpha}\right)^{\frac{1}{\alpha}} = \left(\frac{2\epsilon - 1}{8}\right)^{\frac{1}{\alpha}}$$

$$\boxed{x = \left(\frac{2\epsilon - 1}{8}\right)^{\frac{1}{\alpha}}}$$

$$\frac{\overbrace{x^{a}\,x^{n}\,x}^{=a+n+1}}{4-\alpha} + \Gamma(\alpha-1)^{n}\;{}^{-\Gamma(\alpha-1)^{n}} = 2\;{}^{-\Gamma(\alpha-1)^{n}}$$

$$(4-\alpha)\left(\frac{x^{a+n+1}}{4-\alpha}\right) = \left(2-\Gamma(\alpha-1)^{n}\right)(4-\alpha)$$

$$\left(x^{a+n+1}\right)^{\frac{1}{a+n+1}} = \left(\left(2-\Gamma(\alpha-1)^{n}\right)(4-\alpha)\right)^{\frac{1}{a+n+1}}$$

$$\boxed{x = \left[\left(2-\Gamma(\alpha-1)^{n}\right)(4-\alpha)\right]^{\frac{1}{a+n+1}}}$$

$$\frac{x^{m}\,x}{x} + 2^{-2} = \epsilon^{-2}$$

$$\overbrace{x^{m}\,x\,x^{-1}}^{=m} = \epsilon - 2$$

$$\left(x^{m}\right)^{\frac{1}{m}} = \left(\epsilon-2\right)^{\frac{1}{m}}$$

$$\boxed{x = \left(\epsilon-2\right)^{\frac{1}{m}}}$$

$$\frac{x^{n}(1-\alpha)}{\beta(1+\alpha)} + 2^{-2} = \epsilon^{-2}$$

$$\beta(1+\alpha)\left(\frac{x^{n}(1-\alpha)}{\beta(1+\alpha)}\right) = (\epsilon - 2)\,\beta(1+\alpha)$$

$$x^{n}(1-\alpha) = (\epsilon - 2)\,\beta(1+\alpha)$$

$$\left(x^{n}\right)^{\frac{1}{n}} = \left(\frac{\beta(\epsilon-2)(1+\alpha)}{1-\alpha}\right)^{\frac{1}{n}}$$

$$\boxed{x = \left[\beta\,\frac{(\epsilon-2)(1+\alpha)}{1-\alpha}\right]^{\frac{1}{n}}}$$

$$\overbrace{\frac{x^{n}\,x^{2}}{x}}^{=\,n+1} + 4^{-4} = \sum_{i=1}^{n} r_i^{2^{-4}}$$

$$\left(x^{n+1}\right)^{\frac{1}{n+1}} = \left(\sum_{i=1}^{n} r_i^{2} - 4\right)^{\frac{1}{n+1}}$$

$$\boxed{x = \left[\sum_{i=1}^{n} r_i^{2} - 4\right]^{\frac{1}{n+1}}}$$

$$\frac{x^n}{x^m(1-\alpha)} + 4^{-4} = \epsilon^{-4}$$

$$(1-\alpha)\left(\frac{x^n}{x^m(1-\alpha)}\right) = (\epsilon - 4)(1-\alpha)$$

$$\left(\frac{x^{-m}}{x^{-m}}\right)\frac{x^n}{x^m} = (\epsilon-4)(1-\alpha)$$

$$\left(x^{n-m}\right)^{\frac{1}{n-m}} = \left((\epsilon-4)(1-\alpha)\right)^{\frac{1}{n-m}}$$

$$\boxed{x = \left[(\epsilon-4)(1-\alpha)\right]^{\frac{1}{n-m}}}$$

$$\left(\frac{x^{-\alpha}}{x^{-\alpha}}\right)\frac{x^2(1-\epsilon)}{x^\alpha(1+\epsilon)} = m$$

$$\left(\frac{1+\epsilon}{1-\epsilon}\right)\left(\frac{(x^{2-\alpha})(1-\epsilon)}{1+\epsilon}\right) = (m)\left(\frac{1+\epsilon}{1-\epsilon}\right)$$

$$\left(x^{2-\alpha}\right)^{\frac{1}{2-\alpha}} = \left(\frac{m(1+\epsilon)}{1-\epsilon}\right)^{\frac{1}{2-\alpha}}$$

$$\boxed{x = \left[m\,\frac{1+\epsilon}{1-\epsilon}\right]^{\frac{1}{2-\alpha}}}$$

$$(2x)^2 + x^2 = \alpha$$

$$4x^2 + x^2 = \alpha$$

$$\frac{5x^2}{5} = \frac{\alpha}{5}$$

$$(x^2)^{\frac{1}{2}} = \left(\frac{\alpha}{5}\right)^{\frac{1}{2}}$$

$$\boxed{x = \left(\frac{\alpha}{5}\right)^{\frac{1}{2}}}$$

$$[(\alpha - 1)x]^n - 4 = \epsilon$$

$$+4 \qquad +4$$

$$\left([(\alpha-1)x]^n\right)^{\frac{1}{n}} = (\epsilon + 4)^{\frac{1}{n}}$$

$$(\alpha - 1)x = (\epsilon + 4)^{\frac{1}{n}}$$

$$\boxed{x = \frac{(\epsilon + 4)^{\frac{1}{n}}}{(\alpha - 1)}}$$

$$\left[\alpha x\right]^n - x^n = 18$$

$$\alpha^n x^n - x^n = 18$$

$$x^n(\alpha^n - 1) = 18$$

$$\left(x^n\right)^{\frac{1}{n}} = \left(\frac{18}{\alpha^n - 1}\right)^{\frac{1}{n}}$$

$$\boxed{x = \left[\frac{18}{\alpha^n - 1}\right]^{\frac{1}{n}}}$$

$$\left[(\alpha - 1)x^2\right]^n - \left[2x^n\right]^2 = \gamma$$

$$(\alpha - 1)^n x^{2n} - 4x^{2n} = \gamma$$

$$x^{2n}\left[(\alpha - 1)^n - 4\right] = \gamma$$

$$\left(x^{2n}\right)^{\frac{1}{2n}} = \left(\frac{\gamma}{\left[(\alpha - 1)^n - 4\right]}\right)^{\frac{1}{2n}}$$

$$\boxed{x = \left(\frac{\gamma}{(\alpha - 1)^n - 4}\right)^{\frac{1}{2n}}}$$

$$\left(\left[\frac{\alpha x^2}{x^a}\right]^b\right)^{\frac{1}{b}} = \left(\epsilon\right)^{\frac{1}{b}}$$

$$\alpha x^{2-a} = \epsilon^{\frac{1}{b}}$$

$$\left(x^{2-a}\right)^{\frac{1}{2-a}} = \left(\frac{\epsilon^{\frac{1}{b}}}{\alpha}\right)^{\frac{1}{2-a}}$$

$$\boxed{x = \left[\frac{\epsilon^{\frac{1}{b}}}{\alpha}\right]^{\frac{1}{2-a}}}$$

$$\sqrt{x^a} = 4$$

$$\left(x^a\right)^{\frac{1}{2}} = 4$$

$$\left(x^{\frac{a}{2}}\right)^{\frac{2}{a}} = \left(4\right)^{\frac{2}{a}}$$

$$\boxed{x = 4^{\frac{2}{a}} = 16^{\frac{1}{a}}}$$

$$\left[\frac{x^{\frac{1}{2}}\sqrt{x}}{x}\right]^2 - x = 0$$

$$\left[x^{\frac{1}{2}}x^{\frac{1}{2}}x^{-1}\right]^2 - x = 0$$

$$\left[x^{0}\right]^2 - x = 0$$

$$[1]^2 - x^{x+} = 0^{x+}$$

$$\boxed{x = 1}$$

$$\left[\sqrt[3]{x^{\alpha}}\; x^{\frac{3}{\alpha}}\right]^2 + \epsilon^{-\epsilon} = 8^{-\epsilon}$$

$$\left[x^{\frac{\alpha}{3}}\; x^{\frac{3}{\alpha}}\right]^2 = 8 - \epsilon$$

$$x^{\frac{\alpha}{3}+\frac{3}{\alpha}} = (8-\epsilon)^{\frac{1}{2}}$$

$$\boxed{x = \left[8-\epsilon\right]^{\frac{1}{2\left(\frac{\alpha}{3}+\frac{3}{\alpha}\right)}}}$$

$$\left[2\sqrt[3]{x^{\alpha}}\right]^{\frac{3}{\alpha}} - x = 4$$

$$\left[2\, x^{\frac{\alpha}{3}}\right]^{\frac{3}{\alpha}} - x = 4$$

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

$$x\left(2^{\frac{3}{\alpha}} - 1\right) = 4$$

$$\boxed{x = \frac{4}{8^{\frac{1}{\alpha}} - 1}}$$

$$\sqrt{x^2 - \alpha^2} = \alpha x$$

$$\left(x^2 - \alpha^2\right)^{\frac{1}{2}} = \alpha x$$

$$x^2 - \alpha^2 = (\alpha x)^2$$

$$x^2 - \alpha^2 \overset{-\alpha^2 x^2}{\underset{+\alpha^2}{}} = \alpha^2 x^2 \overset{-\alpha^2 x^2}{\underset{+\alpha^2}{}}$$

$$x^2 - \alpha^2 x^2 = \alpha^2$$

$$x^2\left(1 - \alpha^2\right) = \alpha^2$$

$$\left(x^2\right)^{\frac{1}{2}} = \left(\frac{\alpha^2}{1 - \alpha^2}\right)^{\frac{1}{2}}$$

$$x = \left(\frac{\alpha^2}{1 - \alpha^2}\right)^{\frac{1}{2}}$$

$$\boxed{x = \frac{\alpha}{\left(1 - \alpha^2\right)^{\frac{1}{2}}} = \frac{\alpha}{\sqrt{1 - \alpha^2}}}$$

$$(x^2+1)^{\frac{1}{2}} + 2 \;{\scriptstyle -2} = \epsilon^n \;{\scriptstyle -2}$$

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

$$x^2+1 \;{\scriptstyle -1} = (\epsilon^n - 2)^2 \;{\scriptstyle -1}$$

$$(x^2)^{\frac{1}{2}} = \left((\epsilon^n - 2)^2 - 1\right)^{\frac{1}{2}}$$

$$\boxed{x = \pm\left([\epsilon^n - 2]^2 - 1\right)^{\frac{1}{2}}}$$

$$\sqrt{(4-x)^2 + 4^2} = \epsilon + 1$$

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

$$(4-x)^2 + 16 \;{\scriptstyle -16} = (\epsilon+1)^2 \;{\scriptstyle -16}$$

$$\left((4-x)^2\right)^{\frac{1}{2}} = \left((\epsilon+1)^2 - 16\right)^{\frac{1}{2}}$$

$$4 - x = \left[(\epsilon+1)^2 - 16\right]^{\frac{1}{2}}$$

$$\boxed{x = 4 - \left[(\epsilon+1)^2 - 16\right]^{\frac{1}{2}}}$$