

exponent progression

$$x^2 = 4$$

$$x^2 - 2 = 2$$

w terms

$$2x^2 = 4$$

w coefficients

$$2x^2 - 4 = 4$$

combined.

$$4x^2x^3 - 4 = 8$$

add exponents

$$4 \frac{x^3}{x} - 8 = 16$$

subtract exponents

$$(2x)^2 + x^2 = 8$$

expand brackets

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

include radicals

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

trick questions

exponents with numbers

$$x^2 = 4$$

$$x^3 + 4 = 6$$

$$x^2 - 4 = 10 - x^2$$

$$x^3 + x^3 - 4 = 4$$

$$x^2 x^3 = 32$$

$$\frac{x^2}{x} = 4$$

$$2x^3 + 4 = 8$$

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

$$5x + 4 = 16 - x^2 x^{-1}$$

$$x^2 x^3 x + 4 = 16$$

$$\frac{x^4 x}{x^2 x} + 4 = 8 - x^2$$

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

$$\frac{x^{-4}}{x^2} + 8 = 24$$

$$\frac{x^3 x^2}{x^{-4}} + 8 = 30$$

$$9 - \frac{x^2 x x}{x^3} + 8 = 2x$$

$$(x^2)^3 + 4 = 68$$

$$(x^3)^2 + 2 = 14$$

$$(x^2x)^3 + 2 = 8$$

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

$$2x + 2 = \left(\frac{x^{-3} x^6}{x}\right)^{\frac{1}{2}} + 4$$

$$1 + \left(\frac{x x^{-2}}{x^{-3}}\right)^2 = 16$$

$$\left[(xx^2)^3 \frac{1}{x} \right]^2 = 16$$

$$\left[\frac{x^{-1} x^{-3}}{x^4} \right]^{\frac{1}{4}} + 2 = 16$$

$$[2x]^2 + x^2 = 4$$

$$[2xx^{-1}]^3 - 8 + x = 1$$

$$[2x^3]^2 + 4 = 8$$

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

$$\left[\frac{4x^3 x^{-2}}{x^{-1}} \right]^{\frac{1}{2}} + 3 \left[4x^2 \right]^{\frac{1}{2}} = 8$$

$$\sqrt{2x^2} + x = 8$$

$$\sqrt[3]{x} + x^{\frac{1}{3}} = 4$$

$$4 \left[\frac{x \sqrt{x}}{x} \right]^2 - \sqrt{4x^2} = 16$$

$$\sqrt{x^2 + 1} + 2 = 11$$

$$\sqrt{2x} + 1 = 8$$

$$\sqrt{2+x} + 4 = 8$$

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trick questions

exponents with numbers

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

$$x = 2 \quad \text{but also} \quad x = -2$$

$$\boxed{x = \pm 2}$$

$$x^3 + 4 = 6$$

$$(x^3)^{\frac{1}{3}} = (2)^{\frac{1}{3}}$$

$$\boxed{x = 2^{\frac{1}{3}} \approx 1.26}$$

$$x^{2+x^2} - 4^{+4} = 10^{+4} - x^{2+x^2}$$

$$\frac{2x^2}{2} = \frac{14}{2}$$

$$(x^2)^{\frac{1}{2}} = (7)^{\frac{1}{2}}$$

$$\boxed{x = \pm 7^{\frac{1}{2}} \approx \pm 2.65}$$

$$x^3 + x^3 - 4^{+4} = 4^{+4}$$

$$\frac{2x^3}{2} = \frac{8}{2}$$

$$(x^3)^{\frac{1}{3}} = (4)^{\frac{1}{3}}$$

$$x = 4^{\frac{1}{3}} \approx 1.59$$

$$x^2 x^3 = 32$$

$$xx \cdot xxx = 32$$

$$x^{2+3} = 32$$

$$(x^5)^{\frac{1}{5}} = (32)^{\frac{1}{5}}$$

$$x = 2$$

$$\frac{x^2}{x} = 4$$

$$\frac{xx}{x} = 4$$

$$x^{2-1} = 4$$

$$x = 4$$

$$2x^3 + 4^{-4} = 8^{-4}$$

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

$$(x^3)^{\frac{1}{3}} = (2)^{\frac{1}{3}}$$

$$x = 2^{\frac{1}{3}} \approx 1.26$$

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

$$4x^2 - \frac{1}{2}x^2 = 4$$

$$3\frac{1}{2}x^2 = 4$$

$$(x^2)^{\frac{1}{2}} = \left(\frac{8}{7}\right)^{\frac{1}{2}}$$

$$x = \pm \left(\frac{8}{7}\right)^{\frac{1}{2}} \approx \pm 1.07$$

$$5x + 4^{-4} = 16^{-4} - x^2 - 1 = 1$$

$$5x + x = 12$$

$$6x = 12$$

$$x = 2$$

$$x^2 x^3 x + 4^{-4} = 16^{-4}$$

$$x^6 = 12$$

$$x = \pm 12^{\frac{1}{6}} \approx \pm 1.51$$

$$\frac{x^4 x}{x^2 x} + 4^{-4} = 8^{-4} - x^2$$

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

$$2x^2 = 4$$

$$x = \pm 2^{\frac{1}{2}} \approx \pm 1.41$$

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

$$\frac{1}{2} x^{\cancel{0}+1} + x = 4$$

$$x = 3^{\frac{1}{2}}$$

$$\frac{x^{-4}}{x^2} + 8 = 24$$

$$x^{\boxed{-4-2}=-6} = 16$$

$$x = \pm 16^{-\frac{1}{6}} \approx \pm 0.63$$

$$\frac{x^3 x^2}{x^{-4}} + 8 = 30$$

$$x^{\boxed{3+2-(-4)}=9} = 22$$

$$x = 22^{\frac{1}{9}} \approx 1.41$$

$$9^{-2x} - \frac{x^{\boxed{2}} x x}{x^{\boxed{3}}} + 8 = 2x$$

$2+1+1-3=1$

$$(-1)(-2x - x) = (-17)(-1)$$

$$3x = 17$$

$$x = \frac{17}{3}$$

$$(x^2)^3 + 4 = 68$$

~~$(x^2)(x^2)(x^2)$~~ ^{2x6}

$$x^6 = 64$$

$$x = \pm 2$$

$$(x^3)^2 + 2 = 14$$

$$x^6 = 12$$

$$x = \pm 12^{\frac{1}{6}} \approx \pm 1.51$$

$$(x^2)^3 + 2 = 8$$

$$(x^3)^3 = 6$$

$$x^9 = 6$$

$$x = 6^{\frac{1}{9}} \approx 1.22$$

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

$$x = \pm 2$$

$$\left[(x^4)^2 \right]^{\frac{1}{2}} = [256]^{\frac{1}{2}}$$

$$(x^4)^{\frac{1}{4}} = (16)^{\frac{1}{4}}$$

$$2x + 2 = \left(\frac{x^{-3} x^6}{x} \right)^{\frac{1}{2}} + 4$$

$$x = 2$$

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

$$2x - x = 2$$

$$1 + \left(\frac{x x^{-2}}{x^{-3}} \right)^2 = 16$$

$$(x^2)^2 = 15$$

$$(x^4)^{\frac{1}{4}} = (15)^{\frac{1}{4}}$$

$$x = \pm 15^{\frac{1}{4}} \approx \pm 1.97$$

$$\left(\left[(x x^2)^3 \frac{1}{x} \right]^2 \right)^{\frac{1}{2}} = (16)^{\frac{1}{2}}$$

$$(x^3)^3 x^{-1} = 4$$

$$x^9 x^{-1} = 4$$

$$x^8 = 4$$

$$x = \pm 4^{\frac{1}{8}} \approx \pm 1.19$$

$$\left[\frac{x^{-1} x^{-3}}{x^4} \right]^{\frac{1}{4}} + 2 = 16$$

$$(x^{-8})^{\frac{1}{4}} = 14$$

$$x^{-2} = 14$$

$$x = \pm 14^{-\frac{1}{2}} \approx \pm 0.27$$

$$[2x]^2 + x^2 = 4$$

$$2^2 x^2 + x^2 = 4$$

$$5x^2 = 4$$

$$x^2 = \frac{4}{5}$$

$$x = \pm \frac{4}{5}^{\frac{1}{2}} \approx \pm 0.89$$

$$[2x^0] - 8 + x = 1$$

$$[2x^0]^3 + x = 9$$

$$(x^0 = 1)$$

$$8 - 8 + x = 9 - 8$$

$$x = 1$$

$$[2x^3]^2 + 4 = 8$$

$$([2x^3]^2)^{\frac{1}{2}} = (4)^{\frac{1}{2}}$$

$$\frac{2x^3}{2} = \frac{\pm 2}{2}$$

$$(x^3)^{\frac{1}{3}} = (\pm 1)^{\frac{1}{3}}$$

$$x = \pm 1$$

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

$$[2x]^2 + x^2 = 8$$

$$4x^2 + x^2 = 8$$

$$\frac{5x^2}{5} = \frac{8}{5}$$

$$(x^2)^{\frac{1}{2}} = \left(\frac{8}{5} \right)^{\frac{1}{2}}$$

$$x = \pm \frac{8}{5} = \pm 1.6$$

$$\left[\frac{4x^3 - 2}{x^{-1}} \right]^{\frac{1}{2}} + 3 \left[4x^2 \right]^{\frac{1}{2}} = 8$$

$$\left[4x^2 \right]^{\frac{1}{2}} + 3 \left[2x \right] = 8$$

$$2x + 6x = 8$$

$$\frac{8x}{8} = \frac{8}{8}$$

$$x = 1$$

$$\sqrt[2]{2x^2} + x = 8$$

$$\sqrt{2}x + x = 8$$

$$x(1 + \sqrt{2}) = 8$$

$$x = \frac{8}{1 + \sqrt{2}} \approx 3.31$$

$$\sqrt[3]{x} + x^{\frac{1}{3}} = 4$$

$$(x)^{\frac{1}{3}} + x^{\frac{1}{3}} = 4$$

$$\frac{2x^{\frac{1}{3}}}{2} = \frac{4}{2}$$

$$(x^{\frac{1}{3}})^3 = (2)^3$$

$$x = 8$$

$$4 \left[\frac{\cancel{x} \sqrt{x}}{\cancel{x}} \right]^2 - \sqrt{4x^2} = 16$$

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

$$4x - 2x = 16$$

$$\frac{2x}{2} = \frac{16}{2}$$

$$x = 8$$

$$\sqrt{x^2 + 1} + 2 = 11$$

$$(x^2 + 1)^{\frac{1}{2}} = 9$$

$$x^2 + 1 = 81$$

$$(x^2)^{\frac{1}{2}} = (80)^{\frac{1}{2}}$$

$$x = \pm \sqrt{80} \approx \pm 8.94$$

$$\sqrt{2x} + 1 = 8$$
$$\left[(2x)^{\frac{1}{2}}\right]^2 = [7]^2$$

$$\frac{2x}{2} = \frac{49}{2}$$

$$x = \frac{49}{2} = 24.5$$

$$\sqrt{2+x} + 4 = 8$$

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

$$2+x = 16$$

$$x = 14$$