

Find $\left(\frac{2}{3}\right)^2 \times \left(\frac{2}{5}\right)^{-3} \times \left(\frac{3}{5}\right)^2$

$$\left(\frac{2}{3}\right)^2 \times \left(\frac{2}{5}\right)^{-3} \times \left(\frac{3}{5}\right)^2$$

$$= \left(\frac{2}{3}\right)^2 \times \left(\frac{5}{2}\right)^3 \times \left(\frac{3}{5}\right)^2$$

$$= \frac{2^2}{3^2} \times \frac{5^3}{2^3} \times \frac{3^2}{5^2}$$

$$= \frac{5}{2}$$

Evaluate

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(i) $\sqrt[3]{(343)^{-2}}$

$$\sqrt[3]{(343)^{-2}} = [(343)^{-2}]^{\frac{1}{3}}$$

$$= (343)^{-2 \times \frac{1}{3}}$$

$$= (7^3)^{\frac{-2}{3}}$$

$$= 7[3 \times (\frac{-2}{3})]$$

$$= 7^{-2}$$

$$= \frac{1}{7^2}$$

$$= \frac{1}{49}$$

(ii) $\sqrt[5]{(32)^{-3}}$

$$\sqrt[5]{(32)^{-3}} = [(32)^{-3}]^{\frac{1}{5}}$$

$$= (32)^{-3 \times \frac{1}{5}}$$

$$= (2^5)^{\frac{-3}{5}}$$

$$= 2^{[5 \times (\frac{-3}{5})]}$$

$$= 2^{-3}$$

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

$$= \frac{1}{8}$$

Which of the following is not equal to $\left[\left(\frac{5}{6}\right)^{\frac{1}{5}}\right]^{\frac{-1}{6}}$

(a) $\frac{1}{\left[\left(\frac{5}{6}\right)^{\frac{1}{5}}\right]^{\frac{1}{6}}}$

(b) $\left(\frac{6}{5}\right)^{\frac{1}{30}}$

(c) $\left(\frac{5}{6}\right)^{\frac{-1}{30}}$

(d) $\left(\frac{5}{6}\right)^{\frac{1}{5} - \frac{1}{6}}$

Value of $(256)^{0.16} \times (256)^{0.09}$ is

(A) 4

(B) 16

(C) 64

(D) 256.25

$$(256)^{0.16} \times (256)^{0.09}$$

$$= (256)^{0.16 + 0.09}$$

$$= (256)^{0.25}$$

$$= (256)^{\frac{1}{4}}$$

$$= (2^8)^{\frac{1}{4}} = 2^2 = \mathbf{4}$$

Which of the following is equal to x

(a) $x^{\frac{12}{7}} - x^{\frac{5}{7}}$

(b) $\sqrt[12]{(x^4)^{\frac{1}{3}}}$

(c) $(\sqrt{x^3})^{\frac{2}{3}}$

(d) $x^{\frac{12}{7}} \times x^{\frac{5}{7}}$

Find value of x , if $5^{x-3} \times 3^{2x-8} = 225$

Given

$$5^{x-3} \times 3^{2x-8} = 225$$

$$5^{x-3} \times 3^{2x-8} = 25 \times 9$$

$$5^{x-3} \times 3^{2x-8} = 5^2 \times 3^2$$

Comparing powers of 5 and 3

$$\begin{array}{l|l} x - 3 = 2 & 2x - 8 = 2 \\ \mathbf{x = 5} & 2x = 10 \\ & \mathbf{x = 5} \end{array}$$

If $25^{x-1} = 5^{2x-1} - 100$, find the value of x

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Given

$$25^{x-1} = 5^{2x-1} - 100$$

$$(5^2)^{x-1} = 5^{2x-1} - 100$$

$$5^{2x-2} = 5^{2x-1} - 100$$

$$5^{2x-2} - 5^{2x-1} = -100$$

$$5^{2x} \times 5^{-2} - 5^{2x} \times 5^{-1} = -100$$

$$\frac{5^{2x}}{5^2} - \frac{5^{2x}}{5} = -100$$

$$5^{2x} \left(\frac{1}{5^2} - \frac{1}{5} \right) = -100$$

$$5^{2x} \left(\frac{1-5}{5^2} \right) = -100$$

$$5^{2x} \left(\frac{-4}{5^2} \right) = -100$$

$$5^{2x} = 100 \times \frac{5^2}{4}$$

$$5^{2x} = 25 \times 25$$

$$5^{2x} = 5^2 \times 5^2$$

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

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Thus,

$$2x = 4$$

$$\mathbf{x = 2}$$

Prove that $\frac{2^{30} + 2^{29} + 2^{28}}{2^{31} + 2^{30} - 2^{29}} = \frac{7}{10}$

We have

$$\frac{2^{30} + 2^{29} + 2^{28}}{2^{31} + 2^{30} - 2^{29}} = \frac{2^{28} (2^2 + 2 + 1)}{2^{29} (2^2 + 2 - 1)}$$

$$= \frac{2^{28} (4 + 2 + 1)}{2^{29} (4 + 2 - 1)}$$

$$= 2^{(28 - 29)} \times \frac{7}{5} = 2^{-1} \times \frac{7}{5 \times 2} = \frac{7}{5 \times 2} = \frac{7}{10}$$

$$2^{28} \left(\frac{2^{30}}{2^{28}} + \frac{2^{29}}{2^{28}} + \frac{2^{28}}{2^{28}} \right)$$

$$2^{28} \left(2^{30-28} + 2^{29-28} + 1 \right)$$

Simplify: $\left[5 \left(8^{\frac{1}{3}} + 27^{\frac{1}{3}}\right)^3\right]^{\frac{1}{4}}$

$$\left[5 \left(8^{\frac{1}{3}} + 27^{\frac{1}{3}}\right)^3\right]^{\frac{1}{4}} = \left[5 \left((2^3)^{\frac{1}{3}} + (3^3)^{\frac{1}{3}}\right)^3\right]^{\frac{1}{4}}$$

$$= [5 (2 + 3)^3]^{\frac{1}{4}}$$

$$= [5 (5)^3]^{\frac{1}{4}}$$

$$= [5^4]^{\frac{1}{4}} = 5$$

Simplify $\left(\frac{81}{16}\right)^{-\frac{3}{4}} \times \left[\left(\frac{25}{9}\right)^{-\frac{3}{2}} \div \left(\frac{5}{2}\right)^{-3}\right]$

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$$\left(\frac{81}{16}\right)^{-\frac{3}{4}} \times \left[\left(\frac{25}{9}\right)^{-\frac{3}{2}} \div \left(\frac{5}{2}\right)^{-3}\right] = \left(\frac{3^4}{2^4}\right)^{-\frac{3}{4}} \times \left[\left(\frac{5^2}{3^2}\right)^{-\frac{3}{2}} \div \left(\frac{5}{2}\right)^{-3}\right]$$

$$= \left[\left(\frac{3}{2}\right)^4\right]^{-\frac{3}{4}} \times \left[\left[\left(\frac{5}{3}\right)^2\right]^{-\frac{3}{2}} \div \left(\frac{5}{2}\right)^{-3}\right]$$

$$= \left(\frac{3}{2}\right)^{-3} \times \left[\left(\frac{5}{3}\right)^{-3} \div \left(\frac{5}{2}\right)^{-3}\right]$$

$$= \left(\frac{2}{3}\right)^3 \times \left[\left(\frac{3}{5}\right)^3 \div \left(\frac{2}{5}\right)^3\right] \text{teachoo.com}$$

$$= \frac{2^3}{3^3} \times \left[\frac{3^3}{5^3} \div \frac{2^3}{5^3}\right]$$

$$= \frac{2^3}{3^3} \times \left[\frac{3^3}{5^3} \times \frac{5^3}{2^3}\right]$$

$$= \frac{2^3}{3^3} \times \frac{3^3}{2^3}$$

$$= \mathbf{1}$$