

INDICES - PRACTICE QUESTIONS



metatutor

1.

Evaluate:

$$(a) 6^{-1} = \frac{1}{6}$$

$$(b) 4^{-1} = \frac{1}{4}$$

$$(c) 10^{-1} = \frac{1}{10}$$

$$(d) 3^{-2} = \frac{1}{9}$$

$$(e) 5^{-2} = \frac{1}{25}$$

$$(f) 2^{-3} = \frac{1}{8}$$

$$(g) 10^{-3} = \frac{1}{1000}$$

$$(h) 9^{-2} = \frac{1}{81}$$

2.

Evaluate:

$$(a) 4^{1/2} = 2$$

$$(b) 9^{1/2} = 3$$

$$(c) 100^{1/2} = 10$$

$$(d) 27^{1/3} = 3$$

$$(e) 8^{1/3} = 2$$

$$(f) 64^{1/3} = 4$$

$$(g) 16^{1/4} = 2$$

$$(h) 125^{1/3} = 5$$

3.

Evaluate:

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

$$(b) \left(\frac{2}{3}\right)^{-1} = \frac{3}{2}$$

$$(c) \left(\frac{5}{2}\right)^{-2} = \frac{4}{25}$$

$$(d) \left(\frac{7}{4}\right)^{-1} = \frac{4}{7}$$

$$(e) \left(\frac{6}{5}\right)^{-2} = \frac{25}{36}$$

$$(f) \left(\frac{10}{3}\right)^{-3} = \frac{27}{1000}$$

4.

Evaluate:

$$(a) 4^{-1/2} = \frac{1}{2}$$

$$(b) 16^{-1/2} = \frac{1}{4}$$

$$(c) 25^{-1/2} = \frac{1}{5}$$

$$(d) 8^{-1/3} = \frac{1}{2}$$

$$(e) 27^{-1/3} = \frac{1}{3}$$

$$(f) 100^{-1/2} = \frac{1}{10}$$

$$(g) \left(\frac{49}{9}\right)^{-1/2} = \frac{3}{7}$$

$$(h) \left(\frac{1000}{27}\right)^{-1/3} = \frac{3}{10}$$

5.

Evaluate:

$$(a) 4^{3/2} = 8$$

$$(b) 9^{3/2} = 27$$

$$(c) 100^{3/2} = 1000$$

$$(d) 27^{2/3} = 9$$

$$(e) 125^{2/3} = 25$$

$$(f) 1000^{2/3} = 100$$

$$(g) 8^{4/3} = 16$$

$$(h) 81^{3/4} = 27$$

6.

Evaluate:

$$(a) 8^{-2/3} = \frac{1}{4}$$

$$(b) 25^{-3/2} = \frac{1}{125}$$

$$(c) 9^{-3/2} = \frac{1}{27}$$

$$(d) 64^{-2/3} = \frac{1}{16}$$

$$(e) \left(\frac{1}{4}\right)^{-3/2} = 8$$

$$(f) 32^{-2/5} = \frac{1}{4}$$

$$(g) \left(\frac{16}{9}\right)^{-3/2} = \frac{27}{64}$$

$$(h) \left(\frac{27}{64}\right)^{-2/3} = \frac{16}{9}$$

7.

Evaluate:

$$(a) 9^{-1} = \frac{1}{9}$$

$$(b) 16^{1/2} = 4$$

$$(c) 36^{-1/2} = \frac{1}{6}$$

$$(d) 5^{-2} = \frac{1}{25}$$

$$(e) 4^{3/2} = 8$$

$$(f) \left(\frac{4}{3}\right)^{-2} = \frac{9}{16}$$

$$(g) 125^{1/3} = 5$$

$$(h) 1000^{-2/3} = \frac{1}{100}$$

$$(g) \left(\frac{81}{100}\right)^{-1/2} = \frac{10}{9}$$

$$(h) 3^{-3} = \frac{1}{27}$$

$$(i) 64^{-2/3} = \frac{1}{16}$$

$$(j) 49^{3/2} = 343$$

$$(k) \left(\frac{25}{16}\right)^{-3/2} = \frac{64}{125}$$

$$(l) 216^{2/3} = 36$$

$$(m) 10000^{3/4} = 1000$$

$$(n) 400^{-1/2} = \frac{1}{20}$$

$$(o) 900^{3/2} = 27000$$

$$(p) \left(\frac{144}{121}\right)^{-1/2} = \frac{11}{12}$$

8.

Evaluate:

$$(a) \left(\frac{1}{3}\right)^{-2} + \left(\frac{1}{25}\right)^{-1/2} = 9 + 5 = \underline{14}$$

$$(b) 8^{2/3} \times 4^{3/2} = 4 \times 8 \\ = \underline{32}$$

$$(c) \left(\frac{10}{3}\right)^{-1} - 3^{-2} = \frac{3}{10} - \frac{1}{9} = \frac{27}{90} - \frac{10}{90} = \left(\frac{17}{90}\right)$$

$$(d) 1000^{2/3} \div 25^{1/2} = 100 \div 5 \\ = \underline{20}$$

$$(e) \left(\frac{1}{125}\right)^{-2/3} + \left(\frac{1}{144}\right)^{-1/2} = 25 + 12 \\ = \underline{37}$$

$$(f) \left(\frac{64}{27}\right)^{-1/3} + \left(\frac{1}{16}\right)^{1/4} = \frac{3}{4} + \frac{1}{2} = \frac{3}{4} + \frac{2}{4} = \left(\frac{5}{4}\right)$$

$$(g) 32^{3/5} \times 1600^{-1/2} = 8 \times \frac{1}{40} = \frac{8}{40} = \left(\frac{1}{5}\right)$$

9.
Find x.

$$2^x \times 2^{2x} = 64$$

$$2^x \times 2^{2x} = 2^6$$

$$x + 2x = 6$$

$$3x = 6$$

$$\underline{x = 2}$$

10.
Find x.

$$\frac{3^x}{9} = 3^5$$

$$3^x \div 3^2 = 3^5$$

$$x - 2 = 5$$

$$\underline{x = 7}$$

11.
Find x.

$$\frac{2^{3x+5}}{8} = 2^{2x}$$

$$2^{3x+5} - 2^3 = 2^{2x}$$

$$3x + 5 - 3 = 2x$$

$$3x + 2 = 2x$$

$$\underline{x = -2}$$

12.
Find x.

$$\frac{8^{2x+1}}{2^x} = 4$$

$$8^{2x+1} \div 2^x = 2^2$$

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

$$2^{6x+3} \div 2^x = 2^2$$

$$6x + 3 - x = 2$$

$$5x + 3 = 2$$

$$5x = -1$$

$$\underline{x = -\frac{1}{5}}$$

13.
Find x.

$$\frac{64^{x+1}}{4^x} = 16^{2x-1}$$

$$\begin{aligned}64^{x+1} \div 4^x &= 16^{2x-1} \\ (4^3)^{x+1} \div 4^x &= (4^2)^{2x-1} \\ 4^{3x+3} \div 4^x &= 4^{4x-2}\end{aligned}$$

$$\begin{aligned}3x+3-x &= 4x-2 \\ 2x+3 &= 4x-2 \\ 5 &= 2x \\ \frac{5}{2} &= x\end{aligned}$$

14.
Find x.

$$\frac{2^{2x}}{\sqrt{32}} = \sqrt{8}$$

$$\begin{aligned}2^{2x} \div 2^{5/2} &= 2^{3/2} \\ 2x - \frac{5}{2} &= \frac{3}{2} \\ 2x &= 4 \\ \underline{x} &= \underline{2}\end{aligned}$$

15.
Find x.

$$\sqrt{27} \times 3^x = 81$$

$$\begin{aligned}3^{3/2} \times 3^x &= 3^4 \\ \frac{3}{2} + x &= 4 \\ x &= \frac{5}{2}\end{aligned}$$

16.
Find x.

$$100^{x-1} = \sqrt{1000}$$

$$\begin{aligned}(10^2)^{x-1} &= 10^{3/2} \\ 10^{2x-2} &= 10^{3/2} \\ 2x-2 &= \frac{3}{2} \\ 2x &= \frac{7}{2}\end{aligned}$$

$$x = \frac{7}{4}$$