

# Indices Exercises

$$1^3 = 1, \quad 2^3 = 8, \quad 3^3 = 27, \quad 4^3 = 64, \quad 5^3 = 125, \quad 6^3 = 216$$

$$7^3 = 343, \quad 8^3 = 512, \quad 9^3 = 729, \quad 10^3 = 1000$$

## EXERCISE 10D

Evaluate the following.

1)  $25^{\frac{1}{2}}$

2)  $100^{\frac{1}{2}}$

3)  $64^{\frac{1}{2}}$

4)  $81^{\frac{1}{2}}$

5)  $625^{\frac{1}{2}}$

6)  $27^{\frac{1}{3}}$

7)  $64^{\frac{1}{3}}$

8)  $1000^{\frac{1}{3}}$

9)  $125^{\frac{1}{3}}$

10)  $512^{\frac{1}{3}}$

11)  $144^{\frac{1}{2}}$

12)  $400^{\frac{1}{2}}$

13)  $625^{\frac{1}{4}}$

14)  $81^{\frac{1}{4}}$

15)  $100\,000^{\frac{1}{5}}$

16)  $729^{\frac{1}{6}}$

17)  $32^{\frac{1}{5}}$

18)  $1024^{\frac{1}{10}}$

19)  $1296^{\frac{1}{4}}$

20)  $216^{\frac{1}{3}}$

21)  $16^{-\frac{1}{2}}$

22)  $8^{-\frac{1}{3}}$

23)  $81^{-\frac{1}{4}}$

24)  $3125^{-\frac{1}{5}}$

25)  $1\,000\,000^{-\frac{1}{6}}$

26)  $\left(\frac{25}{36}\right)^{\frac{1}{2}}$

27)  $\left(\frac{100}{36}\right)^{\frac{1}{2}}$

28)  $\left(\frac{64}{81}\right)^{\frac{1}{2}}$

29)  $\left(\frac{81}{25}\right)^{\frac{1}{2}}$

30)  $\left(\frac{25}{64}\right)^{\frac{1}{2}}$

31)  $\left(\frac{27}{125}\right)^{\frac{1}{3}}$

32)  $\left(\frac{8}{512}\right)^{\frac{1}{3}}$

33)  $\left(\frac{1000}{64}\right)^{\frac{1}{3}}$

34)  $\left(\frac{64}{125}\right)^{\frac{1}{3}}$

35)  $\left(\frac{512}{343}\right)^{\frac{1}{3}}$



36) Use the general rule for raising a power to another power to prove that  $x^{\frac{1}{n}}$  is equivalent to  $\sqrt[n]{x}$

$$5) \quad 625^{\frac{1}{2}} = \sqrt{625} = 25$$

$$10) \quad 512^{\frac{1}{3}} = \sqrt[3]{512} = 8$$

$$15) \quad 100,000^{\frac{1}{5}} = \sqrt[5]{100,000} = 10$$

$$20) \quad 216^{\frac{1}{3}} = \sqrt[3]{216} = 6$$

$$25) \quad 1,000,000^{-\frac{1}{6}} = \frac{1}{1,000,000^{\frac{1}{6}}} = \frac{1}{10}$$

$$30) \quad \left(\frac{25}{64}\right)^{\frac{1}{2}} = \sqrt{\frac{25}{64}} = \frac{5}{8}$$

$$35) \quad \left(\frac{512}{343}\right)^{\frac{1}{3}} = \sqrt[3]{\frac{512}{343}} = \frac{8}{7}$$



# Complete the rest of Exercise 6D

## EXERCISE 10E



1 Evaluate the following.

a  $32^{\frac{4}{5}}$

b  $125^{\frac{2}{3}}$

c  $1296^{\frac{3}{4}}$

d  $243^{\frac{4}{5}}$

2 Rewrite the following in index form.

a  $\sqrt[3]{t^2}$

b  $\sqrt[4]{m^3}$

c  $\sqrt[5]{k^2}$

d  $\sqrt{x^3}$

3 Evaluate the following.

a  $8^{\frac{2}{3}}$

b  $27^{\frac{2}{3}}$

c  $16^{\frac{3}{4}}$

d  $625^{\frac{5}{4}}$

4 Evaluate the following.

a  $25^{-\frac{1}{2}}$

b  $36^{-\frac{1}{2}}$

c  $16^{-\frac{1}{4}}$

d  $81^{-\frac{1}{4}}$

e  $16^{-\frac{1}{2}}$

f  $8^{-\frac{1}{3}}$

g  $32^{-\frac{1}{5}}$

h  $27^{-\frac{1}{3}}$

5 Evaluate the following.

a  $25^{-\frac{3}{2}}$

b  $36^{-\frac{3}{2}}$

c  $16^{-\frac{3}{4}}$

d  $81^{-\frac{3}{4}}$

e  $64^{-\frac{4}{3}}$

f  $8^{-\frac{2}{3}}$

g  $32^{-\frac{2}{5}}$

h  $27^{-\frac{2}{3}}$

6 Evaluate the following.

a  $100^{-\frac{5}{2}}$

b  $144^{-\frac{1}{2}}$

c  $125^{-\frac{2}{3}}$

d  $9^{-\frac{3}{2}}$

e  $4^{-\frac{5}{2}}$

f  $64^{-\frac{5}{6}}$

g  $27^{-\frac{4}{3}}$

h  $169^{-\frac{1}{2}}$

$$1d) \quad 243^{\frac{4}{5}} = (\sqrt[5]{243})^4 = 3^4 = 81$$

$$2d) \quad \sqrt{x^3} = x^{\frac{3}{2}}$$

$$3d) \quad 625^{\frac{5}{4}} = (\sqrt[4]{625})^5 = 5^5 = 3125$$

$$5d) \quad 81^{-\frac{3}{4}} = \frac{1}{81^{\frac{3}{4}}} = \frac{1}{(\sqrt[4]{81})^3} = \frac{1}{3^3} = \frac{1}{27}$$

$$5h) \quad 27^{-\frac{2}{3}} = \frac{1}{27^{\frac{2}{3}}} = \frac{1}{(\sqrt[3]{27})^2} = \frac{1}{3^2} = \frac{1}{9}$$

$$6d) \quad 9^{-3/2} = \frac{1}{9^{3/2}} = \frac{1}{(\sqrt[2]{9})^3} = \frac{1}{3^3} = \frac{1}{27}$$

$$6h) \quad 169^{-1/2} = \frac{1}{169^{1/2}} = \frac{1}{\sqrt{169}} = \frac{1}{13}$$

Complete the rest of Exercise 6E