

Raise Numbers to Negative and Fractional Powers

Negative Powers

A negative sign in an index means that you find the reciprocal of the base number.

$$\text{eg } 4^{-1} = \frac{1}{4}$$

$$6^{-3} = \frac{1}{6^3} = \frac{1}{216}$$

$$\left(\frac{3}{4}\right)^{-2} = \left(\frac{4}{3}\right)^2 = \frac{16}{9} = 1\frac{7}{9}$$

Calculate the answers to the following showing each of the stages as shown above.

1 $7^{-3} =$

2 $2^{-4} =$

3 $3^{-2} =$

4 $6^{-1} =$

5 $9^{-5} =$

6 $\left(\frac{4}{5}\right)^{-1} =$

7 $\left(\frac{7}{9}\right)^{-1} =$

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

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

10 $\left(\frac{3}{7}\right)^{-3} =$

11 $\left(\frac{3}{10}\right)^{-2} =$

12 $\left(\frac{8}{11}\right)^{-4} =$

13 $\left(\frac{4}{7}\right)^{-3} =$

14 $\left(\frac{7}{12}\right)^{-4} =$

15 $\left(\frac{5}{8}\right)^{-2} =$

Fractional Powers

A fraction in a power means that you are finding the root of the number. Which root is determined by the denominator. You multiply the number by itself the number of times determined by the numerator.

$$\text{eg } 9^{\frac{1}{2}} = \sqrt{9} = 3$$

$$81^{\frac{3}{4}} = \sqrt[4]{81^3} = 3^3 = 27$$

1. $27^{\frac{1}{3}} =$

2. $27^{\frac{2}{3}} =$

3. $64^{\frac{2}{3}} =$

4. $125^{\frac{4}{3}} =$

5. $16^{\frac{3}{4}} =$

6. $81^{\frac{1}{2}} =$

7. $216^{\frac{2}{3}} =$

8. $729^{\frac{2}{3}} =$

9. $216^{\frac{4}{3}} =$

10. $10000^{\frac{3}{4}} =$

11. $27^{-\frac{1}{3}} =$

12. $81^{-\frac{3}{4}} =$