Indices

PRACTICE SET 26 [PAGE 44]

Practice Set 26 | Q 1 | Page 44

Complete the table below.

Sr. No	Indices (Numbers in index form)	Base	Index	Multiplication form	Value
(i)	3^4	3	4	3 × 3 × 3 × 3	81
(ii)	16^3				
(iii)		(-8)	2		
(iv)				3/7×3/7×3/7×3/7	81/2401
(v)	$(-13)^4$				

Solution:

Sr. No	Indices (Numbers in index form)	Base	Index	Multiplication form	Value
(i)	3^4	3	4	3 × 3 × 3 × 3	81
(ii)	16^3	**16**	**3**	**16 × 16 × 16**	4096
(iii)	$\mathbf{(-8)^2}$	(-8)	2	**(-8) × (-8)**	64
(iv)	$\left(\frac{3}{7}\right)^4$	$\frac{3}{7}$	**4**	$\frac{3}{7} \times \frac{3}{7} \times \frac{3}{7} \times \frac{3}{7}$	$\frac{81}{2401}$
(v)	$(-13)^4$	**- 13**	**4**	**(-13) × (-13)× (-13)× (-13)**	28561

Practice Set 26 | Q 2.1 | Page 44

Find the value of 2^{10} .

Solution: $2^{10} = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

$= 1024$

Practice Set 26 | Q 2.2 | Page 44

Find the value of 5^3 .

Solution: $5^3 = 5 \times 5 \times 5 = 125$

Practice Set 26 | Q 2.3 | Page 44

Find the value of $(-7)^4$

Solution: $(-7)^4 = (-7) \times (-7) \times (-7) \times (-7) = 2401$

Practice Set 26 | Q 2.4 | Page 44

Find the value of $(-6)^3$

Solution: $(-6)^3 = (-6) \times (-6) \times (-6) = -216$

Practice Set 26 | Q 2.5 | Page 44

Find the value of 9^3

Solution: $9^3 = 9 \times 9 \times 9 = 729$

Practice Set 26 | Q 2.6 | Page 44

Find the value of 8^1

Solution: $8^1 = 8$

Practice Set 26 | Q 2.7 | Page 44

Find the value of $\left(\frac{4}{5}\right)^3$

Solution:

$$\left(\frac{4}{5}\right)^3 = \frac{4}{5} \times \frac{4}{5} \times \frac{4}{5}$$

$$= \frac{64}{125}$$

Practice Set 26 | Q 2.8 | Page 44

Find the value of $\left(-\frac{1}{2}\right)^4$

Solution:

$$\left(-\frac{1}{2}\right)^4 = -\frac{1}{2} \times -\frac{1}{2} \times -\frac{1}{2} \times -\frac{1}{2}$$

$$= \frac{1}{16}$$

PRACTICE SET 27 [PAGE 45]

Practice Set 27 | Q 1.1 | Page 45

Simplify: $7^4 \times 7^2$

Solution: It is known that, $a^m \times a^n = a^{m+n}$, where m and n are integers and a is a non-zero rational number.

$7^4 \times 7^2$

$=7^{4+2}$

$=7^6$

Practice Set 27 | Q 1.2 | Page 45

Simplify: $(-11)^5 \times (-11)^2$

Solution: It is known that, $a^m \times a^n = a^{m+n}$, where m and n are integers and a is a non-zero rational number.

$(-11)^5 \times (-11)^2$

$=(-11)^{5+2}$

$=(-11)^7$

Practice Set 27 | Q 1.3 | Page 45

Simplify: $\left(\frac{6}{7}\right)^3 \times \left(\frac{6}{7}\right)^5$

Solution: It is known that, $a^m \times a^n = a^{m+n}$, where m and n are integers and a is a non-zero rational number.

$$\left(\frac{6}{7}\right)^3 \times \left(\frac{6}{7}\right)^5$$

$$= \left(\frac{6}{7}\right)^{3+5}$$

$$= \left(\frac{6}{7}\right)^8$$

Practice Set 27 | Q 1.4 | Page 45

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

Solution: It is known that, $a^m \times a^n = a^{m+n}$, where m and n are integers and a is a non-zero rational number.

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

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

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

Practice Set 27 | Q 1.5 | Page 45

Simplify: $a^{16} \times a^7$

Solution: It is known that, $a^m \times a^n = a^{m+n}$, where m and n are integers and a is a non-zero rational number.

$a^{16} \times a^7$

$=a^{16+7}$

$=a^{23}$

Practice Set 27 | Q 1.6 | Page 45

Simplify: $\left(\frac{P}{5}\right)^3 \times \left(\frac{P}{5}\right)^7$

Solution: It is known that, $a^m \times a^n = a^{m+n}$, where m and n are integers and a is a non-zero rational number.

$$\left(\frac{P}{5}\right)^3 \times \left(\frac{P}{5}\right)^7$$

$$= \left(\frac{P}{5}\right)^{3+7}$$

$$= \left(\frac{P}{5}\right)^{10}$$

PRACTICE SET 28 [PAGE 46]

Practice Set 28 | Q 1.1 | Page 46

Simplify: $a^6 \div a^4$

Solution: It is known that, $a^m \div a^n = a^{m-n}$, where m and n are integers and a is non-zero rational number.

$a^6 \div a^4$

$= a^{6-4}$

$= a^2$

Practice Set 28 | Q 1.2 | Page 46

Simplify: $m^5 \div m^8$

Solution: It is known that, $a^m \div a^n = a^{m-n}$, where m and n are integers and a is non-zero rational number.

$m^5 \div m^8$

$= m^{5-8}$

$= m^{-3}$

Practice Set 28 | Q 1.3 | Page 46

Simplify: $p^3 \div p^{13}$

Solution: It is known that, $a^m \div a^n = a^{m-n}$, where m and n are integers and a is non-zero rational number.

$p^3 \div p^{13}$

$= p^{3-13}$

$= p^{-10}$

Practice Set 28 | Q 1.4 | Page 46

Simplify: $x^{10} \div x^{10}$

Solution: It is known that, $a^m \div a^n = a^{m-n}$, where m and n are integers and a is non-zero rational number.

$x^{10} \div x^{10}$

$= x^{10-10}$

$= x^0$

$= 1 \quad (\because a^0 = 1)$

Practice Set 28 | Q 2.1 | Page 46

Find the value.

$(-7)^{12} \div (-7)^{12}$

Solution: It is known that, $a^m \div a^n = a^{m-n}$, where m and n are integers and a is a non-zero rational number.

$(-7)^{12} \div (-7)^{12}$

$= (-7)^{12-12}$

$= (-7)^0$

$= 1 \quad (\because a^0 = 1)$

Practice Set 28 | Q 2.2 | Page 46

Find the value.

$7^5 \div 7^3$

Solution: It is known that, $a^m \div a^n = a^{m-n}$, where m and n are integers and a is a non-zero rational number.

$7^5 \div 7^3$

$= 7^{5-3}$

$= 7^2$

$= 7 \times 7$

$= 49$

Practice Set 28 | Q 2.3 | Page 46

Find the value.

$$\left(\frac{4}{5}\right)^3 \div \left(\frac{4}{5}\right)^2$$

Solution: It is known that, $a^m \div a^n = a^{m-n}$, where m and n are integers and a is a non-zero rational number.

$$\left(\frac{4}{5}\right)^3 \div \left(\frac{4}{5}\right)^2$$

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

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

$$= \frac{4}{5}$$

Practice Set 28 | Q 2.4 | Page 46

Find the value.

$4^7 \div 4^5$

Solution: It is known that, $a^m \div a^n = a^{m-n}$, where m and n are integers and a is a non-zero rational number.

$4^7 \div 4^5$

$= 4^{7-5}$

$= 4^2$

$= 4 \times 4$

$= 16$

PRACTICE SET 29 [PAGE 48]

Practice Set 29 | Q 1.01 | Page 48

Simplify: $\left[\left(\frac{15}{12}\right)^{3}\right]^{4}$

Solution: It is known that, $(a^m)^n = a^{mn}$, where m and n are integers and a is a non-zero rational number.

$$\left[\left(\frac{15}{12}\right)^{3}\right]^{4}$$

$$= \left(\frac{15}{12}\right)^{3\times4}$$

$$= \left(\frac{15}{12}\right)^{12}$$

Practice Set 29 | Q 1.02 | Page 48

Simplify: $(3^4)^{-2}$

Solution: It is known that, $(a^m)^n = a^{mn}$, where m and n are integers and a is a non-zero rational number.

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

$$= 3^4 \times (-2)$$

$$= 3^{-8}$$

Practice Set 29 | Q 1.03 | Page 48

Simplify: $\left(\left(\frac{1}{7}\right)^{-3}\right)^{4}$

Solution: It is known that, $(a^m)^n = a^{mn}$, where m and n are integers and a is a non-zero rational number.

$$\left(\left(\frac{1}{7}\right)^{-3}\right)^{4}$$

$$= \left(\frac{1}{7}\right)^{-3\times4}$$

$$= \left(\frac{1}{7}\right)^{-12}$$

Practice Set 29 | Q 1.04 | Page 48

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

Solution: It is known that, $(a^m)^n = a^{mn}$, where m and n are integers and a is a non-zero rational number.

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

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

$$= \left(\frac{2}{5}\right)^{6}$$

Practice Set 29 | Q 1.05 | Page 48

Simplify: $\left(6^5\right)^4$

Solution: It is known that, $(a^m)^n = a^{mn}$, where m and n are integers and a is a non-zero rational number.

$$\left(6^5\right)^4$$

$$= 6^{5\times4}$$

$$= 6^{20}$$

Practice Set 29 | Q 1.06 | Page 48

Simplify: $\left[\left(\frac{6}{7}\right)^5\right]^2$

Solution: It is known that, $(a^m)^n = a^{mn}$, where m and n are integers and a is a non-zero rational number.

$$\left[\left(\frac{6}{7}\right)^5\right]^2$$

$$= \left(\frac{6}{7}\right)^{5\times2}$$

$$= \left(\frac{6}{7}\right)^{10}$$

Practice Set 29 | Q 1.07 | Page 48

Simplify: $\left[\left(\frac{2}{3}\right)^{-4}\right]^5$

Solution: It is known that, $(a^m)^n = a^{mn}$, where m and n are integers and a is a non-zero rational number.

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

$$= \left(\frac{2}{3}\right)^{-4\times5}$$

$$= \left(\frac{2}{3}\right)^{-20}$$

Practice Set 29 | Q 1.08 | Page 48

Simplify: $\left[\left(\frac{5}{8}\right)^{3}\right]^{-2}$

Solution: It is known that, $(a^m)^n = a^{mn}$, where m and n are integers and a is a non-zero rational number.

$$\left[\left(\frac{5}{8}\right)^{3}\right]^{-2}$$

$$= \left(\frac{5}{8}\right)^{3\times(-2)}$$

$$= \left(\frac{5}{8}\right)^{-6}$$

Practice Set 29 | Q 1.09 | Page 48

Simplify: $\left[\left(\frac{3}{4}\right)^{6}\right]^{1}$

Solution: It is known that, $(a^m)^n = a^{mn}$, where m and n are integers and a is a non-zero rational number.

$$\left[\left(\frac{3}{4}\right)^{6}\right]^{1}$$

$$= \left(\frac{3}{4}\right)^{6\times1}$$

$$= \left(\frac{3}{4}\right)^{6}$$

Practice Set 29 | Q 1.1 | Page 48

Simplify: $\left[\left(\frac{2}{5}\right)^{-3}\right]^{2}$

Solution: It is known that, $(a^m)^n = a^{mn}$, where m and n are integers and a is a non-zero rational number.

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

$$= \left(\frac{2}{5}\right)^{-3\times2}$$

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

Practice Set 29 | Q 2.1 | Page 48

Write the following numbers using positive indices.

$$\left(\frac{2}{7}\right)^{-2}$$

Solution:

It is known that, $a^{-m} = \frac{1}{a^m}$ where m is an integer and a is a non-zero rational number.

$$\left(\frac{2}{7}\right)^{-2}$$

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

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

Practice Set 29 | Q 2.2 | Page 48

Write the following numbers using positive indices.

$$\left(\frac{11}{3}\right)^{-5}$$

Solution:

It is known that, $a^{-m} = \frac{1}{a^m}$ where m is an integer and a is a non-zero rational number.

$$\left(\frac{11}{3}\right)^{-5}$$

$$= \frac{1}{\left(\frac{11}{3}\right)^5}$$

$$= \left(\frac{3}{11}\right)^5$$

Practice Set 29 | Q 2.3 | Page 48

Write the following numbers using positive indices.

$$\left(\frac{1}{6}\right)^{-3}$$

Solution:

It is known that, $a^{-m} = \frac{1}{a^m}$ where m is an integer and a is a non-zero rational number.

$$\left(\frac{1}{6}\right)^{-3}$$

$$= \frac{1}{\left(\frac{1}{6}\right)^3}$$

$$= \left(\frac{6}{1}\right)^3$$

$$= 6^3$$

Practice Set 29 | Q 2.4 | Page 48

Write the following numbers using positive indices.

$(y)^{-4}$

Solution:

It is known that, $a^{-m} = \frac{1}{a^m}$ where m is an integer and a is a non-zero rational number.

$$(y)^{-4}$$

$$= \frac{1}{y^4}$$

$$= \left(\frac{1}{y}\right)^4$$

PRACTICE SET 30 [PAGE 50]

Practice Set 30 | Q 1 | Page 50

Find the square root of 625.

Solution: The prime factorization of 625 is,

625 = 5 × 5 × 5 × 5

To find the square root, we will take one number from each pair and multiply.

$$\sqrt{625} = 5 \times 5 = 25$$

$$\sqrt{625} = 25$$

Practice Set 30 | Q 2 | Page 50

Find the square root of 1225.

Solution: The prime factorization of 1225 is,

1225 = 5 × 5 × 7 × 7

To find the square root, we will take one number from each pair and multiply.

$$\sqrt{1225} = 5 \times 7 = 35$$

$$\sqrt{1225} = 35$$

Practice Set 30 | Q 3 | Page 50

Find the square root of 289.

Solution: The prime factorization of 289 is,

289 = 17 × 17

To find the square root, we will take one number from each pair and multiply.

$$\sqrt{289} = 17 \times 17 = 17$$

$$\sqrt{289} = 17$$

Practice Set 30 | Q 4 | Page 50

Find the square root of 4096.

Solution: The prime factorization of 4096 is,

4096 = 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2

To find the square root, we will take one number from each pair and multiply.

$$\sqrt{4096} = 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 64$$

$$\sqrt{4096} = 64$$

Practice Set 30 | Q 5 | Page 50

Find the square root of 1089.

Solution: The prime factorization of 1089 is,

1089 = $\underline{3 \times 3} \times \underline{11 \times 11}$

To find the square root, we will take one number from each pair and multiply.

$$\sqrt{1089} = 3 \times 11 = 33$$

$$\sqrt{1089} = 33$$