

1. Express the following in exponential form and write the base and index for each

a.  $\frac{4}{11} \times \frac{4}{11} \times \frac{4}{11} \times \frac{4}{11} \times \frac{4}{11} \times \frac{4}{11} \times \frac{4}{11} \times \frac{4}{11}$

c.  $\frac{3}{7} \times \frac{3}{7} \times \frac{3}{7} \times \frac{3}{7} \times \frac{3}{7} \times \frac{3}{7} \times \frac{3}{7} \times \frac{3}{7}$

b.  $\left(\frac{-1}{5}\right) \times \left(\frac{-1}{5}\right) \times \left(\frac{-1}{5}\right) \times \left(\frac{-1}{5}\right)$

d.  $\left(\frac{-12}{13}\right) \times \left(\frac{-12}{13}\right) \times \left(\frac{-12}{13}\right)$

2. Express each of the following as a rational number in the form of  $\left(\frac{p}{q}\right)$ .

a.  $\left(\frac{4}{5}\right)^2$

c.  $\left(\frac{-2}{7}\right)^3$

b.  $\left(\frac{-3}{4}\right)^4$

d.  $\left(\frac{1}{-8}\right)^3$

3. Express each of the following in power notation.

a.  $\frac{27}{512}$

c.  $\frac{9}{16}$

b.  $\frac{(-64)}{125}$

d.  $\left(\frac{-216}{1331}\right)$

4. find the value of :

a.  $\left(\frac{2}{3}\right)^2 \times \left(\frac{2}{12}\right)^3$

c.  $3^3 - 2^3$

b.  $\left(\frac{-5}{6}\right)^3 \div \left(\frac{15}{8}\right)^2$

d.  $\left[\left(\frac{-2}{9}\right)^3 \times \frac{15}{16} \div (-1)^{53}\right]$

5. Find the value of x in the following equations

6. Find the value of x in the following equations

a.  $8^x = 512$

b.  $(-3)^x = -243$

c.  $\frac{1}{1000} = \left(\frac{1}{x}\right)^3$

d.  $\left(\frac{4}{5}\right)^x = \frac{1024}{3125}$

7. Simplify:

a.  $(-1)^{32}$

b.  $2^5 + (-3)^3$

1. Find the reciprocal of the following:

a.  $7^{-3}$

b.  $\left(\frac{3}{11}\right)^2$

c.  $\left(\frac{-5}{9}\right)^{-2}$

d.  $\left(\frac{-1}{2}\right)^5$

2. Evaluate using laws of exponents.

a.  $\left(\frac{2}{5}\right)^{-2} \times \left(\frac{35}{12}\right)^{-2}$

b.  $\left(\frac{-1}{8}\right)^3 \times \left(\frac{32}{3}\right)^3$

c.  $\left(\frac{-4}{9}\right)^2 \times \left(\frac{-4}{9}\right)^3$

d.  $\left(\frac{1}{2}\right)^4 \div \left(\frac{7}{12}\right)^4$

3. Simplify :

a.  $3 \times 5^0$

b.  $\left[\left(\frac{5}{6}\right)^{-1}\right]^{-2}$

c.  $(3^{-2})^{-4}$

d.  $(3^{-1} + 4^{-1})^{-1}$

4. Solve the following to find the value of x.

a.  $5^x = 625$

b.  $4^{3x} = \left(\frac{1}{64}\right)^3$

c.  $2^{2x+1} = 32$

d.  $\left(\frac{3}{7}\right)^5 \times \left(\frac{3}{7}\right)^3 \times \left(\frac{3}{7}\right)^{3+2}$

5. By what number should  $(-6)^{-1}$  be divided so that the quotient is  $(-2)^{-1}$ ?

6. Express the following as negative exponents.

a.  $(-5)^2$

c.  $\left(\frac{12}{31}\right)^5$

b.  $\left(\frac{4}{7}\right)^3$

d.  $\left(\frac{-9}{11}\right)^9$

- Write the following numbers in expanded form.
  - 3060540
  - 7.325
  - 60.25
  - 0.0054
- Write the following numbers in usual form.
  - $1.5268 \times 10^4$
  - $1.2 \times 10^{-5}$
  - $6.6 \times 10^6$
  - $5 \times 1 + 4 \times \frac{1}{10} + 5 \times \frac{1}{100} + 4 \times \frac{1}{1000} + 5 \times \frac{1}{10000}$
- Express the given numbers in standard form.
  - 790000
  - 0.0000282
  - 0.00157
  - $31313 \times 100$
- Through research, scientists found  $1.6 \times 10^{-5}$  kilograms of zinc is found in a person weighing 80 kg. how much zinc is present in 1500 such people. (all the people weigh 80 kg each)
- A box contains  $5 \times 10^2$  paper clips. Each paper clip weighs  $7 \times 10^{-4}$  kilograms. What is the total weight of paper clips in the box?
- Simplify  $(625)^{-\frac{1}{4}} \times \left[ \left( \frac{25}{9} \right)^{\frac{1}{2}} \div \left( \frac{5}{3} \right) \right]^{-2}$
- Find the value of x, if  $(5^{x-3}) \times (3^{2x-8}) = 225$

1. Select the appropriate answer to complete the following sentences:

- a) The multiplicative inverse of  $\left(\frac{-7}{8}\right)^{-3}$  is \_\_\_\_\_
- |                                    |                                     |
|------------------------------------|-------------------------------------|
| i. $\left(\frac{8}{7}\right)^{-3}$ | iii. $\left(\frac{8}{7}\right)^3$   |
| ii. $\left(\frac{7}{8}\right)^3$   | iv. $\left(\frac{7}{8}\right)^{-3}$ |
- b) The exponential form of 256 will be \_\_\_\_\_
- |           |            |
|-----------|------------|
| i. $2^6$  | iii. $4^6$ |
| ii. $4^8$ | iv. $2^8$  |
- c) The value of  $2^0 + 3^0 + 4^0$  is \_\_\_\_\_
- |       |        |
|-------|--------|
| i. 9  | iii. 3 |
| ii. 1 | iv. 0  |
- d) The value of  $\left(\frac{2}{5}\right)^2 \times \left(\frac{2}{5}\right)^{-3} \times \left(\frac{2}{5}\right)^4$  is \_\_\_\_\_
- |                      |                     |
|----------------------|---------------------|
| i. $\frac{8}{125}$   | iii. $\frac{4}{25}$ |
| ii. $\frac{16}{625}$ | iv. $\frac{125}{8}$ |
- e) The standard form of 0.00534 is \_\_\_\_\_
- |                           |                            |
|---------------------------|----------------------------|
| i. $53.4 \times 10^3$     | iii. $5.34 \times 10^{-4}$ |
| ii. $5.34 \times 10^{-3}$ | iv. $5.34 \times 10^3$     |

2. State true or false

- a)  $\left(\left(\frac{1}{2}\right)^2\right)^{-1} = 4$
- b) If  $2^{2x-2} = 1$  then  $x = 2$ .
- c)  $\frac{7^2 \times 7^3 \times 7^5}{7^4} = 7^3$
- d)  $\left(\frac{3}{5}\right)^5 \div \left(\frac{3}{5}\right)^{-2} = \left(\frac{3}{5}\right)^7$
- e) The expanded form of  $0.0031 = 3 \times \frac{1}{1000} + 1 \times \frac{1}{10000}$

3. Solve for x.

- a)  $(-5)^{x+1} \times (-5)^5 = (-5)^7$
- b)  $\left(\frac{2}{3}\right)^{x-2} \div \left(\frac{2}{3}\right)^{-3} = \left(\frac{2}{3}\right)^4$

4. Simplify  $\left(\frac{3}{7}\right)^5 \div \left(\frac{3}{7}\right)^4 = \left(\frac{3}{7}\right)^0$

5. Express the following in standard form.

- |             |                         |
|-------------|-------------------------|
| a) 0.000087 | c) $\frac{1}{10000000}$ |
| b) 602000   | d) $2146.3 \times 10^5$ |