EXPONENTS AND POWERS

LAWS OF EXPONENTS

EXERCISE

Q.1 Find the value of m for which $5^m \div 5^{-3} = 5^5$.

Q.2 Evaluate

(i) $\left\{\left(\frac{1}{3}\right)^{-1} - \left(\frac{1}{4}\right)^{-1}\right\}^{-1}$ (ii) $\left(\frac{5}{8}\right)^{-7} \times \left(\frac{8}{5}\right)^{-4}$

Q.3 Simplify.

(i) $\frac{25 \times t^{-4}}{5^{-3} \times 10 \times t^{-8}} (t \neq 0)$ (ii) $\frac{3^{-5} \times 10^{-5} \times 125}{5^{-7} \times 6^{-5}}$

Q.4. Express each of the following as a rational number of the form $\frac{p}{q}$:

(i) 5^{-3} (ii) $(-2)^{-5}$

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

(v) $\frac{1}{2^{-3}}$

Q.5 Using the laws of exponents, simplify each of the following and express in exponential form:

(i) $3^7 \times 3^{-2}$ (ii) $2^{-7} \div 2^{-3}$

(iii) $(5^2)^{-3}$ (iv) $2^{-3} \times (-7)^{-3}$

(v) $\frac{3^{-5}}{4^{-5}}$

Q.6 Using the laws of exponents simplify and express each of the following in exponential form with positive exponent:

(i) $(-4)^4 \times (-4)^{-10}$ (ii) $2^{-5} \div 2^2$

(iii) $3^{-4} \times 2^{-4}$ (iv) $\left(\frac{1}{2^3}\right)^2$

(v) $(3^{-7} \div 3^{-10}) \times 3^{-5}$ (vi) $(-3)^4 \times \left(\frac{5}{3}\right)^4$

Q.7 Simplify :

(i) $\left(\frac{5}{8}\right)^{-7} \times \left(\frac{8}{5}\right)^{-5}$ (ii) $\left(\frac{-2}{3}\right)^{-2} \times \left(\frac{4}{5}\right)^{-3}$

(iii) $\left(\frac{3}{4}\right)^{-4} \div \left(\frac{3}{2}\right)^{-3}$ (iv) $\left(\frac{3}{7}\right)^{-2} \times \left(\frac{7}{6}\right)^{-3}$

Q.8 Evaluate: $\frac{8^{-1} \times 5^3}{2^{-4}}$

Q.9 Simplify:

(i) $\frac{25 \times a^{-4}}{5^{-3} \times 10 \times a^{-8}}$ (ii) $\frac{3^{-5} \times 10^{-5} \times 125}{5^{-7} \times 6^{-5}}$

Q.10 By what number should $(-12)^{-1}$ be divided so that the quotient may be $\left(\frac{2}{3}\right)^{-1}$?

Q.11 Find x so that $\left(\frac{5}{3}\right)^{-5} \times \left(\frac{5}{3}\right)^{-11} = \left(\frac{5}{3}\right)^{8x}$

ANSWER KYE

1. $m = 2$

2. (i) -1 (ii) $\frac{512}{125}$

3. (i) $\frac{625t^4}{2}$ (ii) 5^5

4. (i) $\frac{1}{125}$ (ii) $-\frac{1}{32}$ (iii) $\frac{27}{64}$

(iv) $\frac{625}{16}$ (v) 8

5. (i) 3^5 (ii) 2^{-4} (iii) 5^{-6}

(vi) $(-14)^{-3}$ (v) $\left(\frac{3}{4}\right)^{-5}$

6. (i) $\left(-\frac{1}{4}\right)^6$ (ii) $\left(\frac{1}{2}\right)^7$ (iii) $\left(\frac{1}{6}\right)^4$

(iv) $\left(\frac{1}{2}\right)^6$ (v) $\left(\frac{1}{3}\right)^2$ (vi) 5^4

7. (i) $\frac{64}{25}$ (ii) $\frac{1125}{256}$

(iii) $\frac{32}{3}$ (iv) $\frac{24}{7}$

8. 250

9. (i) $\frac{625}{2}a^4$ (ii) 5^5

10. $-\frac{1}{18}$

11. – 2