NCERT Solutions For Class 7 Maths Exponents and Powers Exercise 13.1

Q1. Find the value of:

(i) 2^6 (ii) 9^3

(iii) 11^2 (iv)5^4

Ans:

(i) $2^6 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 64$

(ii) $9^3 = 9 \times 9 \times 9 = 729$

(iii) $11^2 = 11 \times 11 = 121$

(iv)$5^4 = 5 \times 5 \times 5 \times 5 = 625$

Q2. Express the following in exponential form:

(i) $6 \times 6 \times 6 \times 6$ (ii) $t \times t$

(iii) $b \times b \times b \times b$ (iv) $5 \times 5 \times 7 \times 7 \times 7$

(v) $2 \times 2 \times a \times a$ (vi) $a \times a \times a \times c \times c \times c \times c \times d$

Ans:

(i) $6 \times 6 \times 6 \times 6 = 6^4$

(ii) $t \times t = t^2$

(iii) $b \times b \times b \times b = b^4$

(iv) $5 \times 5 \times 7 \times 7 \times 7 = 5^2 \times 7^3$

(v) $2 \times 2 \times a \times a = 2^2 \times a^2$

(vi) $a \times a \times a \times c \times c \times c \times c \times d = a^3 c^4 d$

Q3. Express the following numbers using exponential notation:

(i) 512 (ii) 343

(iii) 729 (iv) 3125

Ans:

(i) $512 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 2^9$

(ii) $343 = 7 \times 7 \times 7 = 7^3$

(iii) $729 = 3 \times 3 \times 3 \times 3 \times 3 \times 3 = 3^6$

(iv) $3125 = 5 \times 5 \times 5 \times 5 \times 5 = 5^5$

Q4. Identify the greater number, wherever possible, in each of the following?

(i) 4^3 or 3^4 (ii) 5^3 or 3^5

(iii) 2^8 or 8^2 (iv) 100^2 or 2^{100}

(v) 2^{10} or 10^2

Ans:

(i) $4^3 = 4 \times 4 \times 4 = 64$

$3^4 = 3 \times 3 \times 3 \times 3 = 81$

Therefore, $3^4 > 4^3$

(ii) $5^3 = 5 \times 5 \times 5 = 125$

$3^5 = 3 \times 3 \times 3 \times 3 \times 3 = 243$

Therefore, $3^5 > 5^3$

(iii) $2^8 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 256$

$8^2 = 8 \times 8 = 64$

Therefore, $2^8 > 8^2$

(iv) 100^2 or 2^{100}

$2^{10} = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 1024$

$2^{100} = 1024 \times 1024 \times 1024 \times 1024 \times 1024 \times 1024 \times 1024 \times 1024 \times 1024 \times 1024$

$100^2 = 100 \times 100 = 10000$

Therefore, $2^{100} > 100^2$

(v) 2^{10} and 10^2

$2^{10} = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 1024$

$10^2 = 10 \times 10 = 100$

Therefore, $2^{10} > 10^2$

Q5. Express each of the following as product of powers of their prime factors:

(i) 648 (ii) 405

(iii) 540 (iv) 3,600

Ans:

(i) $648 = 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 = 2^3 \cdot 3^4$

(ii) $405 = 3 \times 3 \times 3 \times 3 \times 5 = 3^4 \cdot 5$

(iii) $540 = 2 \times 2 \times 3 \times 3 \times 3 \times 5 = 2^2 \cdot 3^3 \cdot 5$

(iv) $3600 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 5 = 2^4 \cdot 3^2 \cdot 5^2$

Q6. Simplify:

(i) 2×10^3 (ii) $7^2 \times 2^2$

(iii) $2^3 \times 5$ (iv) 3×4^4

(v) 0×10^2 (vi) $5^2 \times 3^3$

(vii) $2^4 \times 3^2$ (viii) $3^2 \times 10^4$

Ans:

(i) $2 \times 10^3 = 2 \times 10 \times 10 \times 10 = 2 \times 1000 = 2000$

(ii) $7^2 \times 2^2 = 7 \times 7 \times 2 \times 2 = 49 \times 4 = 196$

(iii) $2^3 \times 5 = 2 \times 2 \times 2 \times 5 = 8 \times 5 = 40$

(iv) $3 \times 4^4 = 3 \times 4 \times 4 \times 4 \times 4 = 3 \times 256 = 768$

(v) $0 \times 10^2 = 0 \times 10 \times 10 = 0$

(vi) $5^2 \times 3^3 = 5 \times 5 \times 3 \times 3 \times 3 = 25 \times 27 = 675$

(vii) $2^4 \times 3^2 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 = 16 \times 9 = 144$

(viii) $3^2 \times 10^4 = 3 \times 3 \times 10 \times 10 \times 10 \times 10 = 9 \times 10000 = 90000$

Q7. Simplify:

(i) $(-4)^3$ (ii) $(-3) \times (-2)^3$

(iii) $(-3)^2 \times (-5)^2$ (iv) $(-2)^3 \times (-10)^3$

Ans:

(i) $(-4)^3 = (-4) \times (-4) \times (-4) = -64$

(ii) $(-3) \times (-2)^3 = (-3) \times (-2) \times (-2) \times (-2) = 24$

(iii) $(-3)^2 \times (-5)^2 = (-3) \times (-3) \times (-5) \times (-5) = 9 \times 25 = 225$

(iv) $(-2)^3 \times (-10)^3 = (-2) \times (-2) \times (-2) \times (-10) \times (-10) \times (-10)$

$= (-8) \times (-1000) = 8000$

Q8. Compare the following numbers:

(i) 2.7×10^{12}; 1.5×10^{8}

(ii) 4×10^{14}; 3×10^{17}

Ans:

(i) 2.7×10^{12}; 1.5×10^{8}

$2.7 \times 10^{12} > 1.5 \times 10^{8}$

(ii) 4×10^{14}; 3×10^{17}

$3 \times 10^{17} > 4 \times 10^{14}$

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