CBSE Class –VII Mathematics
NCERT Solutions
Chapter 13 Exponents and Powers (Ex. 13.1)

Question 1. Find the value of:

(i) 2^6 (ii)9^3 (iii)11^2 (iv) 5^4

Answer: (i) 2^6 = 2 x 2 x 2 x 2 x 2 x 2 = 64

(ii) 9^3 = 9 x 9 x 9 = 729

(iii) 11^2 = 11 x 11 = 121

(iv) 5^4 = 5 x 5 x 5 x 5 = 625

Question 2. Express the following in exponential form:

(i) 6 x 6 x 6 x 6   (ii) t x t   (iii) b x b x b x b

(iv) 5 x 5 x 7 x 7 x 7   (v) 2 x 2 x a x a

(vi) a x a x a x c x c x c x c x d

Answer: (i) 6 x 6 x 6 x 6 = 6^4 (ii) t x t = t^2 (iii) b x b x b x b = b^4

(iv) 5 x 5 x 7 x 7 x 7 = 5^2 x 7^3 (v) 2 x 2 x a x a = 2^2 x a^2

(vi) a x a x a x c x c x c x c x d = a^3 x c^4 x d

Question 3. Express each of the following numbers using exponential notation:

(i) 512   (ii) 343   (iii) 729   (iv) 3125

Answer: (i) 512 = 2 x 2 x 2 x 2 x 2 x 2 x 2 x 2 x 2 = 2^9
(ii) 343 = 7 x 7 x 7 = 7^3
(iii) 729 = 3 x 3 x 3 x 3 x 3 x 3 = 3^6

(iv) 3125 = 5 x 5 x 5 x 5 x 5 = 5^5

Question 4. 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

Answer: (i) 4^3= 4 x 4 x 4 = 64

3^4= 3 x 3 x 3 x 3 = 81

Since 64 < 81

Thus, 3^4 is greater than 4^3.

(ii) 5^3 = 5 x 5 x 5 = 125

3^5 = 3 x 3 x 3 x 3 x 3 = 243

Since, 125 < 243

Thus, 3^4 is greater than 5^3 .

(iii) 2^8 = 2 x 2 x 2 x 2 x 2 x 2 x 2 x 2 = 256

8^2 = 8 x 8 = 64

Since, 256 > 64

Thus, 2^8 is greater than8^2 .

(iv) 100^2 = 100 x 100 = 10,000

2^{100} = 2 x 2 x 2 x 2 x 2 x .....14 times x .... x 2 = 16,384 x ..... x 2

Since, 10,000 < 16,384 x .... X 2

Thus, 2^{100} is greater than 100^2 .

(v) 2^{10} = 2 x 2 x 2 x 2 x 2 x 2 x 2 x 2 x 2 x 2 = 1,024

10^2 = 10 x 10 = 100

Since, 1,024 > 100

Thus, 2^{10} > 10^2

Question 5. Express each of the following as product of powers of their prime factors:

(i) 648   (ii) 405   (iii) 540   (iv) 3,600

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

(ii) 405 = 5×3^4

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

(iv) 3,600 = $2^4 \times 3^2 \times 5^2$

Question 6. 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) $2^4 \times 63^2$

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

Answer: (i) 2×10^3 = 2 x 10 x 10 x 10 = 2,000

(ii) $7^2 \times 2^2$ = 7 x 7 x 2 x 2 = 196

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

(iv) 3×4^4 = 3 x 4 x 4 x 4 x 4 = 768

(v) 0×10^2 = 0 x 10 x 10 = 0

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

(vii) $2^4 \times 63^2$ = 2 x 2 x 2 x 2 x 3 x 3 = 144

(viii) $3^2 \times 10^4$ = 3 x 3 x 10 x 10 x 10 x 10 = 90,000

Question 7. Simplify:

(i) $(-4)^3$

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

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

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

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

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

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

(iv) $(-2)^3 \times (-10)^3 = (-2) \times (-2) \times (-2) \times (-10) \times (-10) \times (-10) = 8000$

Question 8. Compare the following numbers:

(i) $2.7 \times 10^{12}; 1.5 \ x \ 10^8$

(ii) $4 \times 10^{14}; 3 \times 10^{17}$

Answer: (i) 2.7×10^{12} and $1.5\ x\ 10^8$

On comparing the exponents of base 10,

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

(ii) 4×10^{14} and 3×10^{17}

On comparing the exponents of base 10,

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