

Access answers to Maths NCERT Solutions for Class 7
Chapter 13 – Exponents and Powers Exercise 13.1

1. Find the value of:

(i) 2^6

Solution:-

The above value can be written as,

$$= 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

$$= 64$$

(ii) 9^3

Solution:-

The above value can be written as,

$$= 9 \times 9 \times 9$$

$$= 729$$

(iii) 11^2

Solution:-

The above value can be written as,

$$= 11 \times 11$$

$$= 121$$

(iv) 5^4

Solution:-

The above value can be written as,

$$= 5 \times 5 \times 5 \times 5$$

$$= 625$$

2. Express the following in exponential form:

(i) $6 \times 6 \times 6 \times 6$

Solution:-

The given question can be expressed in the exponential form as 6^4 .

(ii) $t \times t$

Solution:-

The given question can be expressed in the exponential form as t^2 .

(iii) $b \times b \times b \times b$

Solution:-

The given question can be expressed in the exponential form as b^4 .

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

Solution:-

The given question can be expressed in the exponential form as $5^2 \times 7^3$.

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

Solution:-

The given question can be expressed in the exponential form as $2^2 \times a^2$.

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

Solution:-

The given question can be expressed in the exponential form as $a^3 \times c^4 \times d$.

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

(i) 512

Solution:-

The factors of $512 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

So it can be expressed in the exponential form as 2^9 .

(ii) 343

Solution:-

The factors of $343 = 7 \times 7 \times 7$

So it can be expressed in the exponential form as 7^3 .

(iii) 729

Solution:-

The factors of $729 = 3 \times 3 \times 3 \times 3 \times 3 \times 3$

So it can be expressed in the exponential form as 3^6 .

(iv) 3125

Solution:-

The factors of $3125 = 5 \times 5 \times 5 \times 5 \times 5$

So it can be expressed in the exponential form as 5^5 .

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

(i) 4^3 or 3^4

Solution:-

The expansion of $4^3 = 4 \times 4 \times 4 = 64$

The expansion of $3^4 = 3 \times 3 \times 3 \times 3 = 81$

Clearly,

$64 < 81$

So, $4^3 < 3^4$

Hence 3^4 is the greater number.

(ii) 5^3 or 3^5

Solution:-

The expansion of $5^3 = 5 \times 5 \times 5 = 125$

The expansion of $3^5 = 3 \times 3 \times 3 \times 3 \times 3 = 243$

Clearly,

$$125 < 243$$

$$\text{So, } 5^3 < 3^5$$

Hence 3^5 is the greater number.

(iii) 2^8 or 8^2

Solution:-

$$\text{The expansion of } 2^8 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 256$$

$$\text{The expansion of } 8^2 = 8 \times 8 = 64$$

Clearly,

$$256 > 64$$

$$\text{So, } 2^8 > 8^2$$

Hence 2^8 is the greater number.

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

Solution:-

$$\text{The expansion of } 100^2 = 100 \times 100 = 10000$$

$$\text{The expansion of } 2^{100}$$

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

Then,

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

Clearly,

$$100^2 < 2^{100}$$

Hence 2^{100} is the greater number.

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

Solution:-

$$\text{The expansion of } 2^{10} = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 1024$$

$$\text{The expansion of } 10^2 = 10 \times 10 = 100$$

Clearly,

$$1024 > 100$$

$$\text{So, } 2^{10} > 10^2$$

Hence 2^8 is the greater number.

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

(i) 648

Solution:-

$$\text{Factors of } 648 = 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3$$

$$= 2^3 \times 3^4$$

(ii) 405

Solution:-

$$\text{Factors of } 405 = 3 \times 3 \times 3 \times 3 \times 5$$

$$= 3^5 \times 5$$

(iii) 540

Solution:-

$$\text{Factors of } 540 = 2 \times 2 \times 3 \times 3 \times 3 \times 5$$

$$= 2^2 \times 3^3 \times 5$$

(iv) 3,600

Solution:-

$$\text{Factors of } 3600 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 5$$

$$= 2^4 \times 3^2 \times 5^2$$

6. Simplify:

(i) 2×10^3

Solution:-

The above question can be written as,

$$= 2 \times 10 \times 10 \times 10$$

$$= 2 \times 1000$$

$$= 2000$$

(ii) $7^2 \times 2^2$

Solution:-

The above question can be written as,

$$= 7 \times 7 \times 2 \times 2$$

$$= 49 \times 4$$

$$= 196$$

(iii) $2^3 \times 5$

Solution:-

The above question can be written as,

$$= 2 \times 2 \times 2 \times 5$$

$$= 8 \times 5$$

$$= 40$$

(iv) 3×4^4

Solution:-

The above question can be written as,

$$= 3 \times 4 \times 4 \times 4 \times 4$$

$$= 3 \times 256$$

$$= 768$$

(v) 0×10^2

Solution:-

The above question can be written as,

$$= 0 \times 10 \times 10$$

$$= 0 \times 100$$

$$= 0$$

(vi) $5^2 \times 3^3$

Solution:-

The above question can be written as,

$$= 5 \times 5 \times 3 \times 3 \times 3$$

$$= 25 \times 27$$

$$= 675$$

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

Solution:-

The above question can be written as,

$$= 2 \times 2 \times 2 \times 2 \times 3 \times 3$$

$$= 16 \times 9$$

$$= 144$$

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

Solution:-

The above question can be written as,

$$= 3 \times 3 \times 10 \times 10 \times 10 \times 10$$

$$= 9 \times 10000$$

$$= 90000$$

7. Simplify:

(i) $(-4)^3$

Solution:-

The expansion of -4^3

$$= -4 \times -4 \times -4$$

$$= -64$$

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

Solution:-

The expansion of $(-3) \times (-2)^3$

$$= -3 \times -2 \times -2 \times -2$$

$$= -3 \times -8$$

$$= 24$$

$$\text{(iii)} \quad (-3)^2 \times (-5)^2$$

Solution:-

The expansion of $(-3)^2 \times (-5)^2$

$$= -3 \times -3 \times -5 \times -5$$

$$= 9 \times 25$$

$$= 225$$

$$\text{(iv)} \quad (-2)^3 \times (-10)^3$$

Solution:-

The expansion of $(-2)^3 \times (-10)^3$

$$= -2 \times -2 \times -2 \times -10 \times -10 \times -10$$

$$= -8 \times -1000$$

$$= 8000$$

8. Compare the following numbers:

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

Solution:-

By observing the question

Comparing the exponents of base 10,

Clearly,

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

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

Solution:-

By observing the question

Comparing the exponents of base 10,

Clearly,

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

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