

Mathematics

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(Chapter – 13) (Exponents and Powers)

(Class – VII)

Exercise 13.3

Question 1:

Write the following numbers in the expanded form:

279404, 3006194, 2806196, 120719, 20068

Answer 1:

- (i) 2,79,404 = 2,00,000 + 70,000 + 9,000 + 400 + 00 + 4
= $2 \times 100000 + 7 \times 10000 + 9 \times 1000 + 4 \times 100 + 0 \times 10 + 4 \times 1$
= $2 \times 10^5 + 7 \times 10^4 + 9 \times 10^3 + 4 \times 10^2 + 0 \times 10^1 + 4 \times 10^0$
- (ii) 30,06,194 = 30,00,000 + 0 + 0 + 6,000 + 100 + 90 + 4
= $3 \times 1000000 + 0 \times 100000 + 0 \times 10000 + 6 \times 1000 + 1 \times 100 + 9 \times 10 + 4 \times 1$
= $3 \times 10^6 + 0 \times 10^5 + 0 \times 10^4 + 6 \times 10^3 + 1 \times 10^2 + 9 \times 10 + 4 \times 10^0$
- (iii) 28,06,196 = 20,00,000 + 8,00,000 + 0 + 6,000 + 100 + 90 + 6
= $2 \times 1000000 + 8 \times 100000 + 0 \times 10000 + 6 \times 1000 + 1 \times 100 + 9 \times 10 + 6 \times 1$
= $2 \times 10^6 + 8 \times 10^5 + 0 \times 10^4 + 6 \times 10^3 + 1 \times 10^2 + 9 \times 10 + 6 \times 10^0$
- (iv) 1,20,719 = 1,00,000 + 20,000 + 0 + 700 + 10 + 9
= $1 \times 100000 + 2 \times 10000 + 0 \times 1000 + 7 \times 100 + 1 \times 10 + 9 \times 1$
= $1 \times 10^5 + 2 \times 10^4 + 0 \times 10^3 + 7 \times 10^2 + 1 \times 10^1 + 9 \times 10^0$
- (v) 20,068 = 20,000 + 00 + 00 + 60 + 8
= $2 \times 10000 + 0 \times 1000 + 0 \times 100 + 6 \times 10 + 8 \times 1$
= $2 \times 10^4 + 0 \times 10^3 + 0 \times 10^2 + 6 \times 10^1 + 8 \times 10^0$

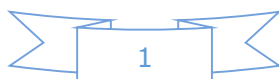
Question 2:

Find the number from each of the following expanded forms:

- (a) $8 \times 10^4 + 6 \times 10^3 + 0 \times 10^2 + 4 \times 10^1 + 5 \times 10^0$
(b) $4 \times 10^5 + 5 \times 10^3 + 3 \times 10^2 + 2 \times 10^0$
(c) $3 \times 10^4 + 7 \times 10^2 + 5 \times 10^0$
(d) $9 \times 10^5 + 2 \times 10^2 + 3 \times 10^1$

Answer 2:

- (a) $8 \times 10^4 + 6 \times 10^3 + 0 \times 10^2 + 4 \times 10^1 + 5 \times 10^0$
= $8 \times 10000 + 6 \times 1000 + 0 \times 100 + 4 \times 10 + 5 \times 1$
= $80000 + 6000 + 0 + 40 + 5$
= 86,045
- (b) $4 \times 10^5 + 5 \times 10^3 + 3 \times 10^2 + 2 \times 10^0$
= $4 \times 100000 + 0 \times 10000 + 5 \times 1000 + 3 \times 100 + 0 \times 10 + 2 \times 1$
= $400000 + 0 + 5000 + 3000 + 0 + 2$
= 4,05,302



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- (c) $3 \times 10^4 + 7 \times 10^2 + 5 \times 10^0$
 $= 3 \times 10000 + 0 \times 1000 + 7 \times 100 + 0 \times 10 + 5 \times 1$
 $= 30000 + 0 + 700 + 0 + 5$
 $= 30,705$
- (d) $9 \times 10^5 + 2 \times 10^2 + 3 \times 10^1$
 $= 9 \times 100000 + 0 \times 10000 + 0 \times 1000 + 2 \times 100 + 3 \times 10 + 0 \times 1$
 $= 900000 + 0 + 0 + 200 + 30 + 0$
 $= 9,00,230$

Question 3:

Express the following numbers in standard form:

- | | |
|----------------------|----------------|
| (i) 5,00,00,000 | (ii) 70,00,000 |
| (iii) 3,18,65,00,000 | (iv) 3,90,878 |
| (v) 39087.8 | (vi) 3908.78 |

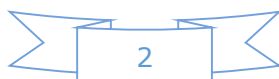
Answer 3:

- | | |
|----------------------|---|
| (i) 5,00,00,000 | $= 5 \times 1,00,00,000 = 5 \times 10^7$ |
| (ii) 70,00,000 | $= 7 \times 10,00,000 = 7 \times 10^6$ |
| (iii) 3,18,65,00,000 | $= 31865 \times 100000$
$= 3.1865 \times 10000 \times 100000 = 3.1865 \times 10^9$ |
| (iv) 3,90,878 | $= 3.90878 \times 100000 = 3.90878 \times 10^5$ |
| (v) 39087.8 | $= 3.90878 \times 10000 = 3.90878 \times 10^4$ |
| (vi) 3908.78 | $= 3.90878 \times 1000 = 3.90878 \times 10^3$ |

Question 4:

Express the number appearing in the following statements in standard form:

- (a) The distance between Earth and Moon is 384,000,000 m.
- (b) Speed of light in vacuum is 300,000,000 m/s.
- (c) Diameter of Earth is 1,27,56,000 m.
- (d) Diameter of the Sun is 1,400,000,000 m.
- (e) In a galaxy there are on an average 100,000,000,000 stars.
- (f) The universe is estimated to be about 12,000,000,000 years old.
- (g) The distance of the Sun from the centre of the Milky Way Galaxy is estimated to be 300,000,000,000,000,000 m.
- (h) 60,230,000,000,000,000,000 molecules are contained in a drop of water weighing 1.8 gm.
- (i) The Earth has 1,353,000,000 cubic km of sea water.
- (j) The population of India was about 1,027,000,000 in march, 2001.



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Answer 4:

- (a) The distance between Earth and Moon = 384,000,000 m
= 384×1000000 m
= $3.84 \times 100 \times 1000000$
= 3.84×10^8 m
- (b) Speed of light in vacuum = 300,000,000 m/s
= 3×100000000 m/s
= 3×10^8 m/s
- (c) Diameter of the Earth = 1,27,56,000 m
= 12756×1000 m
= $1.2756 \times 10000 \times 1000$ m
= 1.2756×10^7 m
- (d) Diameter of the Sun = 1,400,000,000 m
= $14 \times 100,000,000$ m
= $1.4 \times 10 \times 100,000,000$ m
= 1.4×10^9 m
- (e) Average of Stars = 100,000,000,000
= $1 \times 100,000,000,000$
= 1×10^{11}
- (f) Years of Universe = 12,000,000,000 years
= $12 \times 1000,000,000$ years
= $1.2 \times 10 \times 1000,000,000$ years
= 1.2×10^{10} years
- (g) Distance of the Sun from the centre of the Milky Way Galaxy
= 300,000,000,000,000,000 m
= $3 \times 100,000,000,000,000,000$ m
= 3×10^{20} m
- (h) Number of molecules in a drop of water weighing 1.8 gm
= 60,230,000,000,000,000,000
= $6023 \times 10,000,000,000,000,000$
= $6.023 \times 1000 \times 10,000,000,000,000,000$
= 6.023×10^{22}



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(i) The Earth has Sea water

$$\begin{aligned} &= 1,353,000,000 \text{ km}^3 \\ &= 1,353 \times 1000000 \text{ km}^3 \\ &= 1.353 \times 1000 \times 1000,000 \text{ km}^3 \\ &= 1.353 \times 10^9 \text{ km}^3 \end{aligned}$$

(j) The population of India

$$\begin{aligned} &= 1,027,000,000 \\ &= 1027 \times 1000000 \\ &= 1.027 \times 1000 \times 1000000 \\ &= 1.027 \times 10^9 \end{aligned}$$

