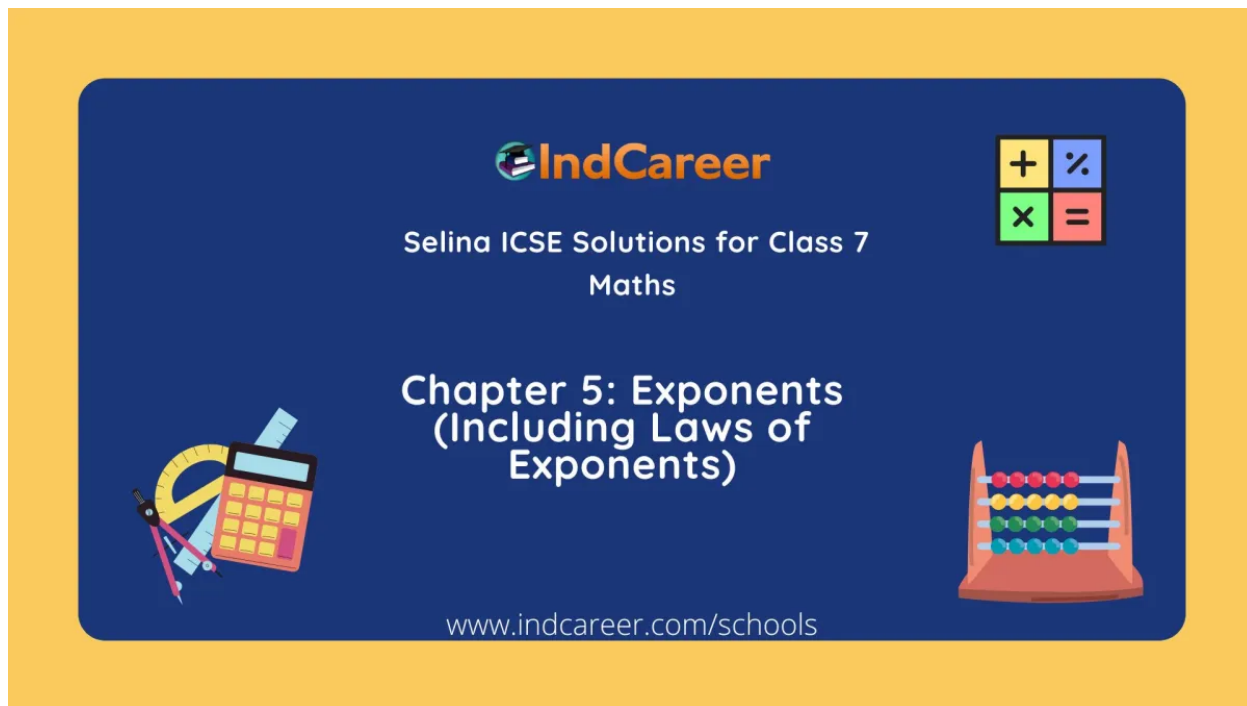


Selina Class 7 ICSE Solutions Mathematics : Chapter 5- Exponents (Including Laws of Exponents)



For any clarifications or questions you can write to info@indcareer.com

Postal Address

IndCareer.com, 52, Shilpa Nagar, Somalwada Nagpur - 440015
Maharashtra, India

WhatsApp: +91 9561 204 888, **Website:** <https://www.indcareer.com> Class 8: Biology
Chapter 6 solutions. Complete Class 8 Biology Chapter 6 Notes.

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>



Selina Class 7 ICSE Solutions Mathematics :

Chapter 5- Exponents (Including Laws of Exponents)

Class 7: Maths Chapter 5 solutions. Complete Class 7 Maths Chapter 5 Notes.

Selina Class 7 ICSE Solutions Mathematics : Chapter 5- Exponents (Including Laws of Exponents)

Selina 7th Maths Chapter 5, Class 7 Maths Chapter 5 solutions

Exercise 5A page: 73

1. Find the value of:

(i) 6^2

(ii) 7^3

(iii) 4^4

(iv) 5^5

(v) 8^3

(vi) 7^5

Solution:

(i) 6^2

It can be written as

$$= 6 \times 6$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

$$= 36$$

(ii) 7^3

It can be written as

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

$$= 343$$

(iii) 4^4

It can be written as

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

$$= 256$$

(iv) 5^5

It can be written as

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

$$= 3125$$

(v) 8^3

It can be written as

$$= 8 \times 8 \times 8$$

$$= 512$$

(vi) 7^5

It can be written as

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

$$= 16807$$

2. Evaluate:

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

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

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

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

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

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

(vi) $5^3 \times 2^4$

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

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

(ix) $(5 \times 4)^2$

Solution:

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

It can be written as

$$= 2 \times 2 \times 2 \times 4 \times 4$$

On further calculation

$$= 8 \times 16$$

$$= 128$$

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

It can be written as

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

On further calculation

$$= 8 \times 25$$

$$= 200$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

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

It can be written as

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

On further calculation

$$= 27 \times 25$$

$$= 675$$

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

It can be written as

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

On further calculation

$$= 4 \times 27$$

$$= 108$$

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

It can be written as

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

On further calculation

$$= 9 \times 125$$

$$= 1125$$

(vi) $5^3 \times 2^4$

It can be written as

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

On further calculation

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

$$= 125 \times 16$$

$$= 2000$$

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

It can be written as

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

On further calculation

$$= 9 \times 16$$

$$= 144$$

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

It can be written as

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

On further calculation

$$= 64 \times 27$$

$$= 1728$$

$$(ix) (5 \times 4)^2$$

It can be written as

$$= 5 \times 5 \times 4 \times 4$$

On further calculation

$$= 25 \times 16$$

$$= 400$$

3. Evaluate:

$$(i) (3/4)^4$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

(ii) $(-5/6)^5$

(iii) $(-3/-5)^3$

Solution:

(i) $(3/4)^4$

It can be written as

$$= (3/4) \times (3/4) \times (3/4) \times (3/4)$$

On further calculation

$$= (3 \times 3 \times 3 \times 3) / (4 \times 4 \times 4 \times 4)$$

$$= 81/256$$

(ii) $(-5/6)^5$

It can be written as

$$= (-5/6) \times (-5/6) \times (-5/6) \times (-5/6) \times (-5/6)$$

On further calculation

$$= [(-5) \times (-5) \times (-5) \times (-5) \times (-5)] / (6 \times 6 \times 6 \times 6 \times 6)$$

$$= -3125/776$$

(iii) $(-3/-5)^3$

It can be written as

$$= (-3/-5) \times (-3/-5) \times (-3/-5)$$

On further calculation

$$= [(-3) \times (-3) \times (-3)] / [(-5) \times (-5) \times (-5)]$$

$$= 27/125$$

4. Evaluate:

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

(i) $(\frac{2}{3})^3 \times (\frac{3}{4})^2$

(ii) $(-\frac{3}{4})^3 \times (\frac{2}{3})^4$

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

Solution:

(i) $(\frac{2}{3})^3 \times (\frac{3}{4})^2$

It can be written as

$$= (\frac{2}{3}) \times (\frac{2}{3}) \times (\frac{2}{3}) \times (\frac{3}{4}) \times (\frac{3}{4})$$

On further calculation

$$= \frac{8}{27} \times \frac{9}{16}$$

$$= \frac{1}{6}$$

(ii) $(-\frac{3}{4})^3 \times (\frac{2}{3})^4$

It can be written as

$$= (-\frac{3}{4}) \times (-\frac{3}{4}) \times (-\frac{3}{4}) \times (\frac{2}{3}) \times (\frac{2}{3}) \times (\frac{2}{3}) \times (\frac{2}{3})$$

On further calculation

$$= -\frac{27}{64} \times \frac{16}{81}$$

$$= -\frac{1}{12}$$

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

It can be written as

$$= (\frac{3}{5}) \times (\frac{3}{5}) \times (-\frac{2}{3}) \times (-\frac{2}{3}) \times (-\frac{2}{3})$$

On further calculation

$$= \frac{9}{25} \times (-\frac{8}{27})$$

$$= -\frac{8}{75}$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

5. Which is greater:

(i) 2^3 or 3^2

(ii) 2^5 or 5^2

(iii) 4^3 or 3^4

(iv) 5^4 or 4^5

Solution:

(i) 2^3 or 3^2

It can be written as

$$2^3 = 2 \times 2 \times 2 = 8$$

$$3^2 = 3 \times 3 = 9$$

Hence, 9 is greater than 8 i.e. $3^2 > 2^3$.

(ii) 2^5 or 5^2

It can be written as

$$2^5 = 2 \times 2 \times 2 \times 2 \times 2 = 32$$

$$5^2 = 5 \times 5 = 25$$

Hence, 32 is greater than 25 i.e. $2^5 > 5^2$.

(iii) 4^3 or 3^4

It can be written as

$$4^3 = 4 \times 4 \times 4 = 64$$

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

Hence, 81 is greater than 64 i.e. $3^4 > 4^3$.

(iv) 5^4 or 4^5

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

It can be written as

$$5^4 = 5 \times 5 \times 5 \times 5 = 625$$

$$4^5 = 4 \times 4 \times 4 \times 4 \times 4 = 1024$$

Hence, 1024 is greater than 625 i.e. $4^5 > 5^4$.

6. Express each of the following in exponential form:

(i) 512

(ii) 1250

(iii) 1458

(iv) 3600

(v) 1350

(vi) 1176

Solution:

(i) 512

It can be written as

2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

So we get

$$512 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 2^9$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

(ii) 1250

It can be written as

2	1250
5	625
5	125
5	25
5	5
	1

So we get

$$1250 = 2 \times 5 \times 5 \times 5 \times 5 = 2 \times 5^4$$

(iii) 1458

It can be written as

2	1458
3	729
3	243
3	81
3	27
3	9
3	3
	1

So we get

$$1458 = 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 = 2 \times 3^6$$

(iv) 3600

It can be written as

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

2	3600
2	1800
2	900
2	450
3	225
3	75
5	25
5	5
	1

So we get

$$3600 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 5 = 2^4 \times 3^2 \times 5^2$$

(v) 1350

It can be written as

2	1350
3	675
3	225
3	75
5	25
5	5
	1

So we get

$$1350 = 2 \times 3 \times 3 \times 3 \times 5 \times 5 = 2 \times 3^3 \times 5^2$$

(vi) 1176

It can be written as

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

2	1176
2	588
2	294
3	147
7	49
7	7
	1

So we get

$$1176 = 2 \times 2 \times 2 \times 3 \times 7 \times 7 = 2^3 \times 3 \times 7^2$$

7. If $a = 2$ and $b = 3$, find the value of:

(i) $(a + b)^2$

(ii) $(b - a)^3$

(iii) $(a \times b)^a$

(iv) $(a \times b)^b$

Solution:

(i) $(a + b)^2$

By substituting the values of a and b

$$= (2 + 3)^2$$

On further calculation

$$= 5^2$$

$$= 5 \times 5$$

$$= 25$$

(ii) $(b - a)^3$

By substituting the values of a and b

$$= (3 - 2)^3$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

On further calculation

$$= 1^3$$

$$= 1 \times 1 \times 1$$

$$= 1$$

(iii) $(a \times b)^a$

By substituting the values of a and b

$$= (2 \times 3)^2$$

On further calculation

$$= 6^2$$

$$= 6 \times 6$$

$$= 36$$

(iv) $(a \times b)^b$

By substituting the values of a and b

$$= (2 \times 3)^3$$

On further calculation

$$= 6^3$$

$$= 6 \times 6 \times 6$$

$$= 216$$

8. Express:

(i) 1024 as a power of 2.

(ii) 343 as a power of 7.

(iii) 729 as a power of 3.

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

Solution:

(i) 1024 as a power of 2.

It can be written as

2	1024
2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

So we get

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

(ii) 343 as a power of 7.

It can be written as

7	343
7	49
7	7
	1

So we get

$$343 = 7 \times 7 \times 7 = 7^3$$

(iii) 729 as a power of 3.

It can be written as

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

$$\begin{array}{r|l} 3 & 729 \\ \hline 3 & 243 \\ \hline 3 & 81 \\ \hline 3 & 27 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

So we get

$$729 = 3 \times 3 \times 3 \times 3 \times 3 \times 3 = 3^6$$

9. If $27 \times 32 = 3^x \times 2^y$; find the values of x and y.

Solution:

It is given that

$$27 \times 32 = 3^x \times 2^y$$

So we get

$$27 = 3^x$$

$$\begin{array}{r|l} 3 & 27 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

Here

$$27 = 3 \times 3 \times 3 = 3^3 = 3^x$$

We get

$$x = 3$$

Similarly

$$32 = 2^y$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

$$\begin{array}{r|l} 2 & 32 \\ \hline 2 & 16 \\ \hline 2 & 8 \\ \hline 2 & 4 \\ \hline 2 & 2 \\ \hline & 1 \end{array}$$

Here

$$32 = 2 \times 2 \times 2 \times 2 \times 2 = 2^5 = 2^y$$

We get

$$y = 5$$

10. If $64 \times 625 = 2^a \times 5^b$; find: (i) the values of a and b. (ii) $2^b \times 5^a$.

Solution:

(i) the values of a and b

It is given that

$$64 \times 625 = 2^a \times 5^b$$

We know that

$$64 = 2^a$$

$$\begin{array}{r|l} 2 & 64 \\ \hline 2 & 32 \\ \hline 2 & 16 \\ \hline 2 & 8 \\ \hline 2 & 4 \\ \hline 2 & 2 \\ \hline & 1 \end{array}$$

We can write it as

$$64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

So we get

$$64 = 2^6$$

$$a = 6$$

Similarly

$$625 = 5^b$$

5	625
5	125
5	25
5	5
	1

We can write it as

$$625 = 5 \times 5 \times 5 \times 5$$

So we get

$$625 = 5^4$$

$$b = 4$$

$$(ii) 2^b \times 5^a$$

Substituting the values of a and b

$$= 2^4 \times 5^6$$

It can be written as

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

So we get

$$= 16 \times 15625$$

$$= 250000$$

Exercise 5B page: 75

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

1. Fill in the blanks:

(i) In $5^2 = 25$, base = and index =

(ii) If index = $3x$ and base = $2y$, the number =

Solution:

(i) In $5^2 = 25$, base = 5 and index = 2.

(ii) If index = $3x$ and base = $2y$, the number = $2y^{3x}$.

2. Evaluate:

(i) $2^8 \div 2^3$

(ii) $2^{3+} 2^8$

(iii) $(2^6)^0$

(iv) $(3^0)^6$

(v) $8^3 \times 8^{-5} \times 8^4$

(vi) $5^4 \times 5^3 \div 5^5$

(vii) $5^4 \div 5^3 \times 5^5$

(viii) $4^4 \div 4^3 \times 4^0$

(ix) $(3^5 \times 4^7 \times 5^8)^0$

Solution:

(i) $2^8 \div 2^3$

It can be written as

$$= 2^8 / 2^3$$

On further calculation

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

$$= 2^{8-3}$$

$$= 2^5$$

$$(ii) 2^{3+} 2^8$$

It can be written as

$$= 2^3 / 2^8$$

On further calculation

$$= 2^{3-8}$$

So we get

$$= 2^{-5}$$

$$= 1/2^5$$

$$(iii) (2^6)^0$$

It can be written as

$$= 2^{6 \times 0}$$

On further calculation

$$= 2^0$$

So we get

$$= 1$$

$$(iv) (3^0)^6$$

It can be written as

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

$$= 3^{0 \times 6}$$

On further calculation

$$= 3^0$$

So we get

$$= 1$$

$$(v) 8^3 \times 8^{-5} \times 8^4$$

It can be written as

$$= 8^{3+4-5}$$

On further calculation

$$= 8^{7-5}$$

So we get

$$= 8^2$$

$$(vi) 5^4 \times 5^3 \div 5^5$$

It can be written as

$$= (5^4 \times 5^3) / 5^5$$

On further calculation

$$= 5^{4+3-5}$$

So we get

$$= 5^{7-5}$$

$$= 5^2$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

(vii) $5^4 \div 5^3 \times 5^5$

It can be written as

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

On further calculation

$$= 5^{4-3+5}$$

So we get

$$= 5^6$$

(viii) $4^4 \div 4^3 \times 4^0$

It can be written as

$$= 4^4 / (4^3 \times 4^0)$$

On further calculation

$$= 4^4 / (4^3 \times 1)$$

So we get

$$= 4^4 / 4^3$$

$$= 4^{4-3}$$

$$= 4^1$$

$$= 4$$

(ix) $(3^5 \times 4^7 \times 5^8)^0$

It can be written as

$$= 3^{5 \times 0} \times 4^{7 \times 0} \times 5^{8 \times 0}$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

On further calculation

$$= 3^0 \times 4^0 \times 5^0$$

So we get

$$= 1 \times 1 \times 1$$

$$= 1$$

3. Simplify, giving answers with positive index:

(i) $2b^6 \cdot b^3 \cdot 5b^4$

(ii) $x^2y^3 \cdot 6x^5y \cdot 9x^3y^4$

(iii) $(-a)^5 (a^2)$

(iv) $(-y)^2 (-y)^3$

(v) $(-3)^2 (3)^3$

(vi) $(-4x) (-5x^2)$

(vii) $(5a^2b) (2ab^2) (a^3b)$

(viii) $x^{2a+7} \cdot x^{2a-8}$

(ix) $3^y \cdot 3^2 \cdot 3^{-4}$

(x) $2^{4a} \cdot 2^{3a} \cdot 2^{-a}$

(xi) $4x^2y^2 \div 9x^3y^3$

(xii) $(10^2)^3 (x^8)^{12}$

(xiii) $(a^{10})^{10} (1^6)^{10}$

(xiv) $(n^2)^2 (-n^2)^3$

(xv) $-(3ab)^2 (-5a^2bc^4)^2$

(xvi) $(-2)^2 \times (0)^3 \times (3)^3$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

(xvii) $(2a^3)^4 (4a^2)^2$

(xviii) $(4x^2y^3)^3 \div (3x^2y^3)^3$

(xix) $\left(\frac{1}{2x}\right)^3 \times (6x)^2$

(xx) $\left(\frac{1}{4ab^2c}\right)^2 \div \left(\frac{3}{2a^2bc^2}\right)^4$

(xxi) $\frac{(5x^7)^3 (10x^2)^2}{(2x^6)^7}$

(xxii) $\frac{(7p^2q^3r^5)^2 (4pqr)^3}{(14p^6q^{10}r^4)^2}$

Solution:

(i) $2b^6 \cdot b^3 \cdot 5b^4$

It can be written as

$$= 2 \times 5 \times b^{6+3+4}$$

On further calculation

$$= 10 b^{13}$$

(ii) $x^2y^3 \cdot 6x^5y \cdot 9x^3y^4$

It can be written as

$$= 6 \times 9 \times x^{2+5+3} \times y^{3+1+4}$$

On further calculation

$$= 54 x^{10} y^8$$

(iii) $(-a)^5 (a^2)$

It can be written as

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

$$= (-1 \times a)^5 \times a^2$$

On further calculation

$$= (-1)^5 \times a^{5+2}$$

So we get

$$= -1 \times a^7$$

$$= -a^7$$

$$(iv) (-y)^2 (-y)^3$$

It can be written as

$$= (-1 \times y)^2 \cdot (-1 \times y)^3$$

On further calculation

$$= (-1)^2 \cdot y^2 \cdot (-1)^3 \times y^3$$

So we get

$$= 1^{2+3} \cdot y^{2+3}$$

$$= 1^5 y^5$$

$$= y^5$$

$$(v) (-3)^2 (3)^3$$

It can be written as

$$= (-1 \times 3)^2 \cdot (3)^3$$

On further calculation

$$= (-1)^2 \times 3^2 \cdot 3^3$$

So we get

$$= (-1)^2 \cdot 3^{2+3}$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

$$= 1 \cdot 3^5$$

$$= 3^5$$

$$(vi) (-4x) (-5x^2)$$

It can be written as

$$= (-1 \times 4 \times x) \cdot (-1 \times 5 \times x^2)^1$$

On further calculation

$$= (-1 \times 4 \times x) \cdot (-1 \times 5 \times x^2)$$

So we get

$$= -1 \times -1 \times 4 \times 5 \times x^{1+2}$$

Here

$$= -1^{1+1} \cdot 4^1 \cdot 5^1 x^3$$

$$= 20 x^3$$

$$(vii) (5a^2b) (2ab^2) (a^3b)$$

It can be written as

$$= 5 \times 2 \times a^{2+1+3} \times b^{1+2+1}$$

On further calculation

$$= 10 a^6 b^4$$

$$(viii) x^{2a+7} \cdot x^{2a-8}$$

It can be written as

$$= x^{2a+7+2a-8}$$

On further calculation

$$= x^{4a-1}$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

$$(ix) 3^y \cdot 3^2 \cdot 3^{-4}$$

It can be written as

$$= 3^y \cdot 3^2/3^4$$

On further calculation

$$= 3^y \cdot (3 \times 3) / (3 \times 3 \times 3 \times 3)$$

So we get

$$= 3^y \times 1/3^2$$

$$= 3^{y-2}$$

$$(x) 2^{4a} \cdot 2^{3a} \cdot 2^{-a}$$

It can be written as

$$= 2^{4a+3a-a}$$

On further calculation

$$= 2^{7a-a}$$

So we get

$$= 2^{6a}$$

$$(xi) 4x^2y^2 \div 9x^3y^3$$

It can be written as

$$= 4x^2y^2 / 9x^3y^3$$

On further calculation

$$= 4x^{2-3}y^{2-3} / 9$$

So we get

$$= 4x^{-1}y^{-1} / 9$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

$$= 4/9xy$$

$$(xii) (10^2)^3 (x^8)^{12}$$

It can be written as

$$= 10^{2 \times 3} \cdot x^{8 \times 12}$$

On further calculation

$$= 10^6 x^{96}$$

$$(xiii) (a^{10})^{10} (1^6)^{10}$$

It can be written as

$$= a^{10 \times 10} \cdot 1^{6 \times 10}$$

On further calculation

$$= a^{100} \cdot 1^{60}$$

So we get

$$= a^{100}$$

$$(xiv) (n^2)^2 (-n^2)^3$$

It can be written as

$$= n^{2 \times 2} \cdot (-n)^{2 \times 3}$$

On further calculation

$$= n^4 \cdot (-n)^6$$

So we get

$$= - n^4 - 1^6 n^6$$

$$= - n^{4+6}$$

$$= - n^{10}$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

$$(xv) - (3ab)^2 (-5a^2bc^4)^2$$

It can be written as

$$= - (3^2a^2b^2) \times (-1)^2 \times 5^2a^{2 \times 2}b^2c^{4 \times 2}$$

On further calculation

$$= - (3^2a^2b^2) (5^2a^4b^2c^8)$$

So we get

$$= - 3^2 \cdot 5^2 \cdot a^{2+4} b^{2+2} c^8$$

$$= - 225a^6b^4c^8$$

$$(xvi) (-2)^2 \times (0)^3 \times (3)^3$$

It can be written as

$$= 4 \times 0 \times 27$$

On further calculation

$$= 0$$

$$(xvii) (2a^3)^4 (4a^2)^2$$

It can be written as

$$= (2a^3)^4 (2^2a^2)^2$$

On further calculation

$$= 2^4 a^{3 \times 4} \cdot 2^{2 \times 2} \cdot a^{2 \times 2}$$

So we get

$$= 2^4 a^{12} \cdot 2^4 a^4$$

Here

$$= 2^{4+4} \cdot a^{12+4}$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

$$= 2^8 a^{16}$$

We get

$$= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times a^{16}$$

$$= 256 a^{16}$$

$$(xviii) (4x^2y^3)^3 \div (3x^2y^3)^3$$

It can be written as

$$= \frac{4^3 x^{2 \times 3} y^{3 \times 3}}{3^3 x^{2 \times 3} y^{3 \times 3}}$$

On further calculation

$$= \frac{4^3 x^6 y^9}{3^3 x^6 y^9}$$

By further simplification

$$= \frac{4^3}{3^3}$$
$$= \frac{64}{27}$$

$$(xix) \left(\frac{1}{2x} \right)^3 \times (6x)^2$$

It can be written as

$$= \frac{1^3}{2^3 \times x^3} \times 6^2 \times x^2$$

On further calculation

$$= \frac{1^3 \times 6^2}{2^3 \times x^{3-2}}$$

By further simplification

$$= \frac{6^2}{2^3 x}$$

So we get

$$\begin{aligned} &= \frac{6 \times 6}{2 \times 2 \times 2 \times x} \\ &= \frac{9}{2x} \end{aligned}$$

$$(xx) \left(\frac{1}{4ab^2c} \right)^2 \div \left(\frac{3}{2a^2bc^2} \right)^4$$

It can be written as

$$= \left(\frac{1}{4ab^2c}\right)^2 \times \left(\frac{2a^2bc^2}{3}\right)^4$$

On further calculation

$$= \frac{1^2}{4^2 a^2 b^{2 \times 2} c^2} \times \frac{2^4 a^{2 \times 4} b^4 c^{2 \times 4}}{3^4}$$

By further simplification

$$= \frac{1^2}{3^4} \times a^{8-2} b^{4-4} c^{8-2}$$

So we get

$$= \frac{1}{3 \times 3 \times 3 \times 3} a^6 b^0 c^6$$

$$= \frac{1}{81} a^6 c^6$$

$$(xxi) \frac{(5x^7)^3 (10x^2)^2}{(2x^6)^7}$$

It can be written as

$$= \frac{5^3 x^{7 \times 3} 10^2 x^{2 \times 2}}{2^7 x^{6 \times 7}}$$

On further calculation

$$= 5^3 10^2 2^{-7} x^{21+4-42}$$

By further simplification

$$= \frac{5^3 \times 10^2}{2^7 x^{17}}$$

So we get

$$= \frac{5 \times 5 \times 5 \times 2 \times 5 \times 2 \times 5}{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times x^{17}}$$

$$= \frac{5^5}{2^5 x^{17}}$$

$$= \frac{3125}{32 x^{17}}$$

$$(xxii) \frac{(7p^2q^8r^5)^2 (4pqr)^3}{(14p^6q^{10}r^4)^2}$$

It can be written as

$$= \frac{(7^2 p^{2 \times 2} q^{8 \times 2} r^{5 \times 2})(4^3 p^3 q^3 r^3)}{14^2 p^{6 \times 2} q^{10 \times 2} r^{4 \times 2}}$$

On further calculation

$$= \frac{7 \times 7 p^4 q^{18} r^{10} 4 \times 4 \times 4 p^3 q^3 r^3}{2 \times 7 \times 2 \times 7 \times p^{12} q^{20} r^8}$$

By further simplification

$$= p^{4-12+3} q^{18-20+3} r^{10-8+3} 4 \times 4 = 16 p^{-5} q r^5$$

$$= \frac{16 q r^5}{p^5}$$

So we get

4. Simplify and express the answer in the positive exponent form:

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

$$(i) \frac{(-3)^3 \times 2^6}{6 \times 2^3}$$

$$(ii) \frac{(2^3)^5 \times 5^4}{4^3 \times 5^2}$$

$$(iii) \frac{36 \times (-6)^2 \times 3^6}{12^3 \times 3^5}$$

$$(iv) -\frac{128}{2187}$$

$$(v) \frac{a^{-7} \times b^{-7} \times c^5 \times d^4}{a^3 \times b^{-5} \times c^{-3} \times d^8}$$

$$(vi) (a^3 b^{-5})^{-2}$$

Solution:

$$(i) \frac{(-3)^3 \times 2^6}{6 \times 2^3}$$

It can be written as

$$= \frac{(-3)^3 \times 2^6}{2 \times 3 \times 2^3}$$

On further calculation

$$= \frac{(-3)^3 \times 2^6}{3 \times 2^{3+1}}$$

So we get

$$= - (3)^{3-1} 2^{6-4}$$

$$= - (3)^2 2^2$$

$$= - 3^2 2^2$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

$$(iii) \frac{36 \times (-6)^2 \times 3^6}{12^3 \times 3^5}$$

It can be written as

$$= \frac{6 \times 6 \times (-6)^2 \times 3^6}{3^3 \times 4^3 \times 3^5}$$

On further calculation

$$= \frac{6^2 \times (-6)^2 \times 3^{6-3-5}}{4^3}$$

So we get

$$= \frac{6^2 \times (-6)^2 3^{-2}}{4^3}$$

$$= \frac{6^2 (-6)^2}{3^2 \times 4^3}$$

$$\begin{aligned} \text{We can write it as} &= \frac{9}{4} \\ &= \left(\frac{3}{2}\right)^2 \\ &= \frac{6 \times 6 \times -6 \times -6}{3 \times 3 \times 4 \times 4 \times 4} \end{aligned}$$

$$(ii) \frac{(2^3)^5 \times 5^4}{4^3 \times 5^2}$$

It can be written as

$$= \frac{2^{3 \times 5} \times 5^4}{2^3 \times 2^2 \times 5^2}$$

On further calculation

$$= \frac{2^{15} \times 5^4}{2^6 \times 5^2}$$

So we get

$$= 2^{15-6} \times 5^{4-2}$$

$$= 2^9 \times 5^2$$

(iv) – 128/2187

So we get

2	128	3	2187
2	64	3	729
2	32	3	243
2	16	3	81
2	8	3	27
2	4	3	9
2	2	3	3
1		1	

It can be written as

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

$$(v) \frac{a^{-7} \times b^{-7} \times c^5 \times d^4}{a^3 \times b^{-5} \times c^{-3} \times d^8}$$

It can be written as

$$= a^{-7-3} \times b^{-7+5} \times c^{5-(-3)} \times d^{4-8}$$

So we get

$$\begin{aligned} &= -\frac{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2}{3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3} = a^{-10} \times b^{-2} \times c^8 \times d^{-4} \\ &= -\frac{2^7}{3^7} = \frac{c^8}{a^{10} \times b^2 \times d^4} \end{aligned}$$

$$(vi) (a^3 b^{-5})^{-2}$$

It can be written as

$$= a^{3 \times -2} b^{-5 \times -2}$$

So we get

$$= a^{-6} b^{10}$$

$$= b^{10} / a^6$$

5. Evaluate:

$$(i) 6^{-2} \div (4^{-2} \times 3^{-2})$$

$$(ii) \left[\left(\frac{5}{6} \right)^2 \times \frac{9}{4} \right] \div \left[\left(-\frac{3}{2} \right)^2 \times \frac{125}{216} \right]$$

$$(iii) 5^3 \times 3^2 + (17)^0 \times 7^3$$

$$(iv) 2^5 \times 15^0 + (-3)^3 - (2/7)^{-2}$$

$$(v) (2^2)^0 + 2^{-4} \div 2^{-6} + (1/2)^{-3}$$

$$(vi) 5^n \times 25^{n-1} \div (5^{n-1} \times 25^{n-1})$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

Solution:

(i) $6^{-2} \div (4^{-2} \times 3^{-2})$

It can be written as

$$= (1/6)^2 \div (1/4)^2 \times (1/3)^2$$

On further calculation

$$= 1/36 \div 1/16 \times 1/9$$

So we get

$$= 1/36 \div 1/144$$

$$= 1/36 \times 144/1$$

$$= 4$$

$$\begin{array}{r} 36 \overline{) \begin{array}{r} 144 \\ 144 \\ \hline 0 \end{array}} 4 \end{array} \quad (ii) \left[\left(\frac{5}{6} \right)^2 \times \frac{9}{4} \right] \div \left[\left(-\frac{3}{2} \right)^2 \times \frac{125}{216} \right]$$

It can be written as

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

$$= \left[\left(\frac{5 \times 5}{6 \times 6} \right) \times \frac{9}{4} \right] \div \left[\left(\frac{-3 \times -3}{2 \times 2} \right) \times \frac{125}{216} \right]$$

On further calculation

$$= \left[\frac{25}{36} \times \frac{9}{4} \right] \div \left[\frac{9}{4} \times \frac{125}{216} \right]$$

So we get

$$= \left[\frac{25}{4} \times \frac{1}{4} \right] \div \left[\frac{1}{4} \times \frac{125}{24} \right]$$

By multiplication

$$= \left[\frac{25}{16} \right] \div \left[\frac{125}{96} \right]$$

We get

$$= \frac{25}{16} \times \frac{96}{125}$$

By simplification

$$= \frac{1}{1} \times \frac{6}{5}$$

$$= 1\frac{1}{5}$$

$$(iii) 5^3 \times 3^2 + (17)^0 \times 7^3$$

It can be written as

$$= 5 \times 5 \times 5 \times 3 \times 3 + (17)^0 \times 7 \times 7 \times 7$$

On further calculation

$$= 125 \times 9 + 1 \times 343$$

So we get

$$= 1125 + 343$$

$$= 1468$$

$$(iv) 2^5 \times 15^0 + (-3)^3 - (2/7)^{-2}$$

It can be written as

$$= 2 \times 2 \times 2 \times 2 \times 2 \times 1 + (-3) \times (-3) \times (-3) - (7/2) \times (7/2)$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

By further calculation

$$= 32 \times 1 - 27 - 49/4$$

Here we get LCM = 4

$$= (32 \times 4)/(1 \times 4) - (27 \times 4)/(1 \times 4) - 49/(4 \times 1)$$

So we get

$$= (128 - 108 - 49)/4$$

By subtraction

$$= -29/4$$

$$= -7 \frac{1}{4}$$

$$(v) (2^2)^0 + 2^{-4} \div 2^{-6} + (1/2)^{-3}$$

It can be written as

$$= (4)^0 + (1/2)^4 \div (1/2)^6 + (2/1)^3$$

By further calculation

$$= 1 + (1/2 \times 1/2 \times 1/2 \times 1/2) \div (1/2 \times 1/2 \times 1/2 \times 1/2 \times 1/2 \times 1/2) + (2/1 \times 2/1 \times 2/1)$$

So we get

$$= 1 + (1/2 \times 1/2 \times 1/2 \times 1/2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2) + 8$$

On further simplification

$$= 1 + 4 + 8$$

$$= 13$$

$$(vi) 5^n \times 25^{n-1} \div (5^{n-1} \times 25^{n-1})$$

It can be written as

$$= 5^n \times 25^{n-1} \times 1/(5^{n-1} \times 25^{n-1})$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

By further calculation

$$= 5^n \times 1/5^{n-1}$$

So we get

$$= 5^{n-n+1}$$

$$= 5^1$$

6. If $m = -2$ and $n = 2$; find the value of:

(i) $m^2 + n^2 - 2mn$

(ii) $m^n + n^m$

(iii) $6m^{-3} + 4n^2$

(iv) $2n^3 - 3m$

Solution:

(i) $m^2 + n^2 - 2mn$

It is given that

$$m = -2 \text{ and } n = 2$$

Substituting the values we get

$$= (-2)^2 + 2^2 - 2(-2)(2)$$

By further calculation

$$= 4 + 4 - (-8)$$

So we get

$$= 8 + 8$$

$$= 16$$

$$= 2^4$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

2	16
2	8
2	4
2	2
	1

(ii) $m^n + n^m$

It is given that $m = -2$ and $n = 2$

Substituting the values we get

$$= (-2)^2 + (2)^{-2}$$

We can write it as

$$= 4 + \frac{1}{2} \times \frac{1}{2}$$

We get the LCM = 4

$$= (4 \times 4) / (1 \times 4) + \frac{1}{4}$$

So we get

$$= (16 + 1) / 4$$

$$= 17 / 4$$

$$= 4 \frac{1}{4}$$

(iii) $6m^{-3} + 4n^2$

It is given that

$$m = -2 \text{ and } n = 2$$

Substituting the values

$$= 6 (-2)^{-3} + 4 (2)^2$$

It can be written as

$$= 6 \times \frac{1}{-2} \times \frac{1}{-2} \times \frac{1}{-2} + 4 \times 2 \times 2$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

So we get

$$= -\frac{3}{4} + 16$$

Here the LCM = 4

$$= (-3 + 16 \times 4) / 4$$

By calculation

$$= (-3 + 64) / 4$$

$$= -61/4$$

$$= 15 \frac{1}{4}$$

$$(iv) 2n^3 - 3m$$

It is given that

$$m = -2 \text{ and } n = 2$$

By substituting the values

$$= 2(2)^3 - 3(-2)$$

It can be written as

$$= 2 \times (2 \times 2 \times 2) - 3 \times (-2)$$

By further calculation

$$= 16 - 3 \times (-2)$$

So we get

$$= 16 + 6$$

$$= 22$$

Exercise 5B

1. Fill in the blanks:

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>



(i) In $5^2 = 25$, base = and index =

(ii) If index = $3x$ and base = $2y$, the number =

Solution:

(i) In $5^2 = 25$, base = 5 and index = 2.

(ii) If index = $3x$ and base = $2y$, the number = $2y^{3x}$.

2. Evaluate:

(i) $2^8 \div 2^3$

(ii) $2^{3 \div 2} \cdot 2^8$

(iii) $(2^6)^0$

(iv) $(3^0)^6$

(v) $8^3 \times 8^{-5} \times 8^4$

(vi) $5^4 \times 5^3 \div 5^5$

(vii) $5^4 \div 5^3 \times 5^5$

(viii) $4^4 \div 4^3 \times 4^0$

(ix) $(3^5 \times 4^7 \times 5^8)^0$

Solution:

(i) $2^8 \div 2^3$

It can be written as

$$= 2^8 / 2^3$$

On further calculation

$$= 2^{8-3}$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

$$= 2^5$$

$$(ii) 2^{3+} 2^8$$

It can be written as

$$= 2^3 / 2^8$$

On further calculation

$$= 2^{3-8}$$

So we get

$$= 2^{-5}$$

$$= 1/2^5$$

$$(iii) (2^6)^0$$

It can be written as

$$= 2^{6 \times 0}$$

On further calculation

$$= 2^0$$

So we get

$$= 1$$

$$(iv) (3^0)^6$$

It can be written as

$$= 3^{0 \times 6}$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

On further calculation

$$= 3^0$$

So we get

$$= 1$$

$$(v) 8^3 \times 8^{-5} \times 8^4$$

It can be written as

$$= 8^{3+4-5}$$

On further calculation

$$= 8^{7-5}$$

So we get

$$= 8^2$$

$$(vi) 5^4 \times 5^3 \div 5^5$$

It can be written as

$$= (5^4 \times 5^3) / 5^5$$

On further calculation

$$= 5^{4+3-5}$$

So we get

$$= 5^{7-5}$$

$$= 5^2$$

$$(vii) 5^4 \div 5^3 \times 5^5$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

It can be written as

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

On further calculation

$$= 5^{4-3+5}$$

So we get

$$= 5^6$$

$$\text{(viii)} \quad 4^4 \div 4^3 \times 4^0$$

It can be written as

$$= 4^4 / (4^3 \times 4^0)$$

On further calculation

$$= 4^4 / (4^3 \times 1)$$

So we get

$$= 4^4 / 4^3$$

$$= 4^{4-3}$$

$$= 4^1$$

$$= 4$$

$$\text{(ix)} \quad (3^5 \times 4^7 \times 5^8)^0$$

It can be written as

$$= 3^{5 \times 0} \times 4^{7 \times 0} \times 5^{8 \times 0}$$

On further calculation

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

$$= 3^0 \times 4^0 \times 5^0$$

So we get

$$= 1 \times 1 \times 1$$

$$= 1$$

3. Simplify, giving answers with positive index:

(i) $2b^6 \cdot b^3 \cdot 5b^4$

(ii) $x^2y^3 \cdot 6x^5y \cdot 9x^3y^4$

(iii) $(-a)^5 (a^2)$

(iv) $(-y)^2 (-y)^3$

(v) $(-3)^2 (3)^3$

(vi) $(-4x) (-5x^2)$

(vii) $(5a^2b) (2ab^2) (a^3b)$

(viii) $x^{2a+7} \cdot x^{2a-8}$

(ix) $3^y \cdot 3^2 \cdot 3^{-4}$

(x) $2^{4a} \cdot 2^{3a} \cdot 2^{-a}$

(xi) $4x^2y^2 \div 9x^3y^3$

(xii) $(10^2)^3 (x^8)^{12}$

(xiii) $(a^{10})^{10} (1^6)^{10}$

(xiv) $(n^2)^2 (-n^2)^3$

(xv) $-(3ab)^2 (-5a^2bc^4)^2$

(xvi) $(-2)^2 \times (0)^3 \times (3)^3$

(xvii) $(2a^3)^4 (4a^2)^2$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

(xviii) $(4x^2y^3)^3 \div (3x^2y^3)^3$

(xix) $\left(\frac{1}{2x}\right)^3 \times (6x)^2$

(xx) $\left(\frac{1}{4ab^2c}\right)^2 \div \left(\frac{3}{2a^2bc^2}\right)^4$

(xxi) $\frac{(5x^7)^3 (10x^2)^2}{(2x^6)^7}$

(xxii) $\frac{(7p^2q^3r^5)^2 (4pqr)^3}{(14p^6q^{10}r^4)^2}$

Solution:

(i) $2b^6 \cdot b^3 \cdot 5b^4$

It can be written as

$$= 2 \times 5 \times b^{6+3+4}$$

On further calculation

$$= 10 b^{13}$$

(ii) $x^2y^3 \cdot 6x^5y \cdot 9x^3y^4$

It can be written as

$$= 6 \times 9 \times x^{2+5+3} \times y^{3+1+4}$$

On further calculation

$$= 54 x^{10} y^8$$

(iii) $(-a)^5 (a^2)$

It can be written as

$$= (-1 \times a)^5 \times a^2$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

On further calculation

$$= (-1)^5 \times a^{5+2}$$

So we get

$$= -1 \times a^7$$

$$= -a^7$$

$$(iv) (-y)^2 (-y)^3$$

It can be written as

$$= (-1 \times y)^2 \cdot (-1 \times y)^3$$

On further calculation

$$= (-1)^2 \cdot y^2 \cdot (-1)^3 \times y^3$$

So we get

$$= 1^{2+3} \cdot y^{2+3}$$

$$= 1^5 y^5$$

$$= y^5$$

$$(v) (-3)^2 (3)^3$$

It can be written as

$$= (-1 \times 3)^2 \cdot (3)^3$$

On further calculation

$$= (-1)^2 \times 3^2 \cdot 3^3$$

So we get

$$= (-1)^2 \cdot 3^{2+3}$$

$$= 1 \cdot 3^5$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

$$= 3^5$$

$$(vi) (-4x) (-5x^2)$$

It can be written as

$$= (-1 \times 4 \times x). (-1 \times 5 \times x^2)^1$$

On further calculation

$$= (-1 \times 4 \times x). (-1 \times 5 \times x^2)$$

So we get

$$= -1 \times -1 \times 4 \times 5 \times x^{1+2}$$

Here

$$= -1^{1+1} \cdot 4^1 \cdot 5^1 x^3$$

$$= 20 x^3$$

$$(vii) (5a^2b) (2ab^2) (a^3b)$$

It can be written as

$$= 5 \times 2 \times a^{2+1+3} \times b^{1+2+1}$$

On further calculation

$$= 10 a^6 b^4$$

$$(viii) x^{2a+7} \cdot x^{2a-8}$$

It can be written as

$$= x^{2a+7+2a-8}$$

On further calculation

$$= x^{4a-1}$$

$$(ix) 3^y \cdot 3^2 \cdot 3^{-4}$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

It can be written as

$$= 3^y \cdot 3^2/3^4$$

On further calculation

$$= 3^y \cdot (3 \times 3)/ (3 \times 3 \times 3 \times 3)$$

So we get

$$= 3^y \times 1/3^2$$

$$= 3^{y-2}$$

$$(x) 2^{4a} \cdot 2^{3a} \cdot 2^{-a}$$

It can be written as

$$= 2^{4a + 3a - a}$$

On further calculation

$$= 2^{7a - a}$$

So we get

$$= 2^{6a}$$

$$(xi) 4x^2y^2 \div 9x^3y^3$$

It can be written as

$$= 4x^2y^2/ 9x^3y^3$$

On further calculation

$$= 4x^{2-3}y^{2-3}/ 9$$

So we get

$$= 4x^{-1}y^{-1}/ 9$$

$$= 4/9xy$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

(xii) $(10^2)^3 (x^8)^{12}$

It can be written as

$$= 10^{2 \times 3} \cdot x^{8 \times 12}$$

On further calculation

$$= 10^6 x^{96}$$

(xiii) $(a^{10})^{10} (1^6)^{10}$

It can be written as

$$= a^{10 \times 10} \cdot 1^{6 \times 10}$$

On further calculation

$$= a^{100} \cdot 1^{60}$$

So we get

$$= a^{100}$$

(xiv) $(n^2)^2 (-n^2)^3$

It can be written as

$$= n^{2 \times 2} \cdot (-n)^{2 \times 3}$$

On further calculation

$$= n^4 \cdot (-n)^6$$

So we get

$$= - n^4 - 1^6 n^6$$

$$= - n^{4+6}$$

$$= - n^{10}$$

(xv) $-(3ab)^2 (-5a^2bc^4)^2$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

It can be written as

$$= - (3^2 a^2 b^2) \times (-1)^2 \times 5^2 a^{2 \times 2} b^2 c^{4 \times 2}$$

On further calculation

$$= - (3^2 a^2 b^2) (5^2 a^4 b^2 c^8)$$

So we get

$$= - 3^2 \cdot 5^2 \cdot a^{2+4} b^{2+2} c^8$$

$$= - 225 a^6 b^4 c^8$$

$$(xvi) (-2)^2 \times (0)^3 \times (3)^3$$

It can be written as

$$= 4 \times 0 \times 27$$

On further calculation

$$= 0$$

$$(xvii) (2a^3)^4 (4a^2)^2$$

It can be written as

$$= (2a^3)^4 (2^2 a^2)^2$$

On further calculation

$$= 2^4 a^{3 \times 4} \cdot 2^{2 \times 2} \cdot a^{2 \times 2}$$

So we get

$$= 2^4 a^{12} \cdot 2^4 a^4$$

Here

$$= 2^{4+4} \cdot a^{12+4}$$

$$= 2^8 a^{16}$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

We get

$$= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times a^{16}$$

$$= 256 a^{16}$$

$$(xviii) (4x^2y^3)^3 \div (3x^2y^3)^3$$

It can be written as

$$= \frac{4^3 x^{2 \times 3} y^{3 \times 3}}{3^3 x^{2 \times 3} y^{3 \times 3}}$$

On further calculation

$$= \frac{4^3 x^6 y^9}{3^3 x^6 y^9}$$

By further simplification

$$\begin{aligned} &= \frac{4^3}{3^3} \\ &= \frac{64}{27} \end{aligned}$$

$$(xix) \left(\frac{1}{2x} \right)^3 \times (6x)^2$$

It can be written as

$$= \frac{1^3}{2^3 \times x^3} \times 6^2 \times x^2$$

On further calculation

$$= \frac{1^3 \times 6^2}{2^3 \times x^{3-2}}$$

By further simplification

$$= \frac{6^2}{2^3 x}$$

So we get

$$\begin{aligned} &= \frac{6 \times 6}{2 \times 2 \times 2 \times x} \\ &= \frac{9}{2x} \end{aligned}$$

$$(xx) \left(\frac{1}{4ab^2c} \right)^2 \div \left(\frac{3}{2a^2bc^2} \right)^4$$

It can be written as

$$= \left(\frac{1}{4ab^2c}\right)^2 \times \left(\frac{2a^2bc^2}{3}\right)^4$$

On further calculation

$$= \frac{1^2}{4^2 a^2 b^{2 \times 2} c^2} \times \frac{2^4 a^{2 \times 4} b^4 c^{2 \times 4}}{3^4}$$

By further simplification

$$= \frac{1^2}{3^4} \times a^{8-2} b^{4-4} c^{8-2}$$

So we get

$$= \frac{1}{3 \times 3 \times 3 \times 3} a^6 b^0 c^6$$

$$= \frac{1}{81} a^6 c^6$$

$$(xxi) \frac{(5x^7)^3 (10x^2)^2}{(2x^6)^7}$$

It can be written as

$$= \frac{5^3 x^{7 \times 3} 10^2 x^{2 \times 2}}{2^7 x^{6 \times 7}}$$

On further calculation

$$= 5^3 10^2 2^{-7} x^{21+4-42}$$

By further simplification

$$= \frac{5^3 \times 10^2}{2^7 x^{17}}$$

So we get

$$= \frac{5 \times 5 \times 5 \times 2 \times 5 \times 2 \times 5}{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times x^{17}}$$

$$= \frac{5^5}{2^5 x^{17}}$$

$$= \frac{3125}{32 x^{17}}$$

$$(xxii) \frac{(7p^2q^8r^5)^2 (4pqr)^3}{(14p^6q^{10}r^4)^2}$$

It can be written as

$$= \frac{(7^2 p^{2 \times 2} q^{8 \times 2} r^{5 \times 2})(4^3 p^3 q^3 r^3)}{14^2 p^{6 \times 2} q^{10 \times 2} r^{4 \times 2}}$$

On further calculation

$$= \frac{7 \times 7 p^4 q^{18} r^{10} 4 \times 4 \times 4 p^3 q^3 r^3}{2 \times 7 \times 2 \times 7 \times p^{12} q^{20} r^8}$$

By further simplification

$$= p^{4-12+3} q^{18-20+3} r^{10-8+3} 4 \times 4 = 16 p^{-5} q r^5$$

$$= \frac{16 q r^5}{p^5}$$

So we get

4. Simplify and express the answer in the positive exponent form:

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

$$(i) \frac{(-3)^3 \times 2^6}{6 \times 2^3}$$

$$(ii) \frac{(2^3)^5 \times 5^4}{4^3 \times 5^2}$$

$$(iii) \frac{36 \times (-6)^2 \times 3^6}{12^3 \times 3^5}$$

$$(iv) -\frac{128}{2187}$$

$$(v) \frac{a^{-7} \times b^{-7} \times c^5 \times d^4}{a^3 \times b^{-5} \times c^{-3} \times d^8}$$

$$(vi) (a^3 b^{-5})^{-2}$$

Solution:

$$(i) \frac{(-3)^3 \times 2^6}{6 \times 2^3}$$

It can be written as

$$= \frac{(-3)^3 \times 2^6}{2 \times 3 \times 2^3}$$

On further calculation

$$= \frac{(-3)^3 \times 2^6}{3 \times 2^{3+1}}$$

So we get

$$= - (3)^{3-1} 2^{6-4}$$

$$= - (3)^2 2^2$$

$$= - 3^2 2^2$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>



$$(iii) \frac{36 \times (-6)^2 \times 3^6}{12^3 \times 3^5}$$

It can be written as

$$= \frac{6 \times 6 \times (-6)^2 \times 3^6}{3^3 \times 4^3 \times 3^5}$$

On further calculation

$$= \frac{6^2 \times (-6)^2 \times 3^{6-3-5}}{4^3}$$

So we get

$$= \frac{6^2 \times (-6)^2 3^{-2}}{4^3}$$

$$= \frac{6^2 (-6)^2}{3^2 \times 4^3}$$

$$\begin{aligned} \text{We can write it as} &= \frac{9}{4} \\ &= \left(\frac{3}{2}\right)^2 \end{aligned}$$

$$(ii) \frac{(2^3)^5 \times 5^4}{4^3 \times 5^2}$$

It can be written as

$$= \frac{2^{3 \times 5} \times 5^4}{2^3 \times 2^2 \times 5^2}$$

On further calculation

$$= \frac{2^{15} \times 5^4}{2^6 \times 5^2}$$

So we get

$$= 2^{15-6} \times 5^{4-2}$$

$$= 2^9 \times 5^2$$

(iv) – 128/2187

So we get

2	128	3	2187
2	64	3	729
2	32	3	243
2	16	3	81
2	8	3	27
2	4	3	9
2	2	3	3
1		1	

It can be written as

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

$$(v) \frac{a^{-7} \times b^{-7} \times c^5 \times d^4}{a^3 \times b^{-5} \times c^{-3} \times d^8}$$

It can be written as

$$= a^{-7-3} \times b^{-7+5} \times c^{5-(-3)} \times d^{4-8}$$

So we get

$$\begin{aligned} &= -\frac{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2}{3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3} = a^{-10} \times b^{-2} \times c^8 \times d^{-4} \\ &= -\frac{2^7}{3^7} = \frac{c^8}{a^{10} \times b^2 \times d^4} \end{aligned}$$

$$(vi) (a^3 b^{-5})^{-2}$$

It can be written as

$$= a^{3 \times -2} b^{-5 \times -2}$$

So we get

$$= a^{-6} b^{10}$$

$$= b^{10} / a^6$$

5. Evaluate:

$$(i) 6^{-2} \div (4^{-2} \times 3^{-2})$$

$$(ii) \left[\left(\frac{5}{6} \right)^2 \times \frac{9}{4} \right] \div \left[\left(-\frac{3}{2} \right)^2 \times \frac{125}{216} \right]$$

$$(iii) 5^3 \times 3^2 + (17)^0 \times 7^3$$

$$(iv) 2^5 \times 15^0 + (-3)^3 - (2/7)^{-2}$$

$$(v) (2^2)^0 + 2^{-4} \div 2^{-6} + (1/2)^{-3}$$

$$(vi) 5^n \times 25^{n-1} \div (5^{n-1} \times 25^{n-1})$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

Solution:

(i) $6^{-2} \div (4^{-2} \times 3^{-2})$

It can be written as

$$= (1/6)^2 \div (1/4)^2 \times (1/3)^2$$

On further calculation

$$= 1/36 \div 1/16 \times 1/9$$

So we get

$$= 1/36 \div 1/144$$

$$= 1/36 \times 144/1$$

$$= 4$$

$$\begin{array}{r} 36 \overline{) \begin{array}{r} 144 \\ 144 \\ \hline 0 \end{array}} 4 \end{array} \quad (ii) \left[\left(\frac{5}{6} \right)^2 \times \frac{9}{4} \right] \div \left[\left(-\frac{3}{2} \right)^2 \times \frac{125}{216} \right]$$

It can be written as

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

$$= \left[\left(\frac{5 \times 5}{6 \times 6} \right) \times \frac{9}{4} \right] \div \left[\left(\frac{-3 \times -3}{2 \times 2} \right) \times \frac{125}{216} \right]$$

On further calculation

$$= \left[\frac{25}{36} \times \frac{9}{4} \right] \div \left[\frac{9}{4} \times \frac{125}{216} \right]$$

So we get

$$= \left[\frac{25}{4} \times \frac{1}{4} \right] \div \left[\frac{1}{4} \times \frac{125}{24} \right]$$

By multiplication

$$= \left[\frac{25}{16} \right] \div \left[\frac{125}{96} \right]$$

We get

$$= \frac{25}{16} \times \frac{96}{125}$$

By simplification

$$= \frac{1}{1} \times \frac{6}{5}$$

$$= 1\frac{1}{5}$$

$$\text{(iii) } 5^3 \times 3^2 + (17)^0 \times 7^3$$

It can be written as

$$= 5 \times 5 \times 5 \times 3 \times 3 + (17)^0 \times 7 \times 7 \times 7$$

On further calculation

$$= 125 \times 9 + 1 \times 343$$

So we get

$$= 1125 + 343$$

$$= 1468$$

$$\text{(iv) } 2^5 \times 15^0 + (-3)^3 - (2/7)^{-2}$$

It can be written as

$$= 2 \times 2 \times 2 \times 2 \times 2 \times 1 + (-3) \times (-3) \times (-3) - (7/2) \times (7/2)$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

By further calculation

$$= 32 \times 1 - 27 - 49/4$$

Here we get LCM = 4

$$= (32 \times 4)/(1 \times 4) - (27 \times 4)/(1 \times 4) - 49/(4 \times 1)$$

So we get

$$= (128 - 108 - 49)/4$$

By subtraction

$$= -29/4$$

$$= -7 \frac{1}{4}$$

$$(v) (2^2)^0 + 2^{-4} \div 2^{-6} + (1/2)^{-3}$$

It can be written as

$$= (4)^0 + (1/2)^4 \div (1/2)^6 + (2/1)^3$$

By further calculation

$$= 1 + (1/2 \times 1/2 \times 1/2 \times 1/2) \div (1/2 \times 1/2 \times 1/2 \times 1/2 \times 1/2 \times 1/2) + (2/1 \times 2/1 \times 2/1)$$

So we get

$$= 1 + (1/2 \times 1/2 \times 1/2 \times 1/2 \times 2 \times 2 \times 2 \times 2 \times 2) + 8$$

On further simplification

$$= 1 + 4 + 8$$

$$= 13$$

$$(vi) 5^n \times 25^{n-1} \div (5^{n-1} \times 25^{n-1})$$

It can be written as

$$= 5^n \times 25^{n-1} \times 1/(5^{n-1} \times 25^{n-1})$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

By further calculation

$$= 5^n \times 1/5^{n-1}$$

So we get

$$= 5^{n-n+1}$$

$$= 5^1$$

6. If $m = -2$ and $n = 2$; find the value of:

(i) $m^2 + n^2 - 2mn$

(ii) $m^n + n^m$

(iii) $6m^{-3} + 4n^2$

(iv) $2n^3 - 3m$

Solution:

(i) $m^2 + n^2 - 2mn$

It is given that

$$m = -2 \text{ and } n = 2$$

Substituting the values we get

$$= (-2)^2 + 2^2 - 2(-2)(2)$$

By further calculation

$$= 4 + 4 - (-8)$$

So we get

$$= 8 + 8$$

$$= 16$$

$$= 2^4$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

2	16
2	8
2	4
2	2
	1

(ii) $m^n + n^m$

It is given that $m = -2$ and $n = 2$

Substituting the values we get

$$= (-2)^2 + (2)^{-2}$$

We can write it as

$$= 4 + \frac{1}{2} \times \frac{1}{2}$$

We get the LCM = 4

$$= (4 \times 4) / (1 \times 4) + \frac{1}{4}$$

So we get

$$= (16 + 1) / 4$$

$$= 17 / 4$$

$$= 4 \frac{1}{4}$$

(iii) $6m^{-3} + 4n^2$

It is given that

$$m = -2 \text{ and } n = 2$$

Substituting the values

$$= 6 (-2)^{-3} + 4 (2)^2$$

It can be written as

$$= 6 \times \frac{1}{-2} \times \frac{1}{-2} \times \frac{1}{-2} + 4 \times 2 \times 2$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

So we get

$$= -\frac{3}{4} + 16$$

Here the LCM = 4

$$= (-3 + 16 \times 4) / 4$$

By calculation

$$= (-3 + 64) / 4$$

$$= -61/4$$

$$= 15 \frac{1}{4}$$

$$(iv) 2n^3 - 3m$$

It is given that

$$m = -2 \text{ and } n = 2$$

By substituting the values

$$= 2(2)^3 - 3(-2)$$

It can be written as

$$= 2 \times (2 \times 2 \times 2) - 3 \times (-2)$$

By further calculation

$$= 16 - 3 \times (-2)$$

So we get

$$= 16 + 6$$

$$= 22$$

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>



<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

Selina Publishers ICSE Solutions

Class 7 Maths

- [Chapter 1- Integers](#)
- [Chapter 2- Rational Numbers](#)
- [Chapter 3- Fraction \(Including Problems\)](#)
- [Chapter 4- Decimal Fractions \(Decimals\)](#)
- [Chapter 5- Exponents \(Including Laws of Exponents\)](#)
- [Chapter 6- Ratio and Proportion \(Including Sharing in a Ratio\)](#)
- [Chapter 7- Unitary Method \(Including Time and Work\)](#)
- [Chapter 8- Percent and Percentage](#)
- [Chapter 9- Profit, Loss and Discount](#)
- [Chapter 10- Simple Interest](#)
- [Chapter 11- Fundamental Concepts \(Including Fundamental Operations\)](#)
- [Chapter 12- Simple Linear Equations \(Including Word Problems\)](#)
- [Chapter 13- Set Concepts](#)
- [Chapter 14- Lines and Angles \(Including Construction of Angles\)](#)
- [Chapter 15- Triangles](#)
- [Chapter 16- Pythagoras Theorem](#)
- [Chapter 17- Symmetry \(Including Reflection and Rotation\)](#)
- [Chapter 18- Recognition of Solids \(Representing 3-D in 2-D\)](#)
- [Chapter 19- Congruency: Congruent Triangles](#)
- [Chapter 20- Mensuration \(Perimeter and Area of Plane Figures\)](#)
- [Chapter 21- Data Handling](#)
- [Chapter 22- Probability](#)

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

About About Selina Publishers ICSE

Selina Publishers has been serving the students since 1976 and is one of the quality ICSE school textbooks publication houses. Mathematics and Science books for classes 6-10 form the core of our business, apart from certain English and Hindi literature as well as a few primary books. All these books are based upon the syllabus published by the Council for the I.C.S.E. Examinations, New Delhi. The textbooks are composed by a panel of subject experts and vetted by teachers practising in ICSE schools all over the country. Continuous efforts are made in complying with the standards and ensuring lucidity and clarity in content, which makes them stand tall in the industry.

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>

About IndCareer

IndCareer.com is a leading developer of online career guidance resources for the Indian marketplace. Established in 2007, IndCareer.com is currently used by over thousands of institutions across India, including schools, employment agencies, libraries, colleges and universities.

IndCareer.com is designed to assist you in making the right career decision - a decision that meets your unique interests and personality.

For any clarifications or questions you can write to **info@indcareer.com**

Postal Address

IndCareer.com
52, Shilpa Nagar,
Somalwada
Nagpur - 440015
Maharashtra, India

WhatsApp: +91 9561 204 888

Website: <https://www.indcareer.com>

<https://www.indcareer.com/schools/selina-class-7-icse-solutions-mathematics-chapter-5-exponents-including-laws-of-exponents/>