



Class : VIII

## WORKSHEET 2

### EXPONENTS AND POWERS

#### Multiple Choice Questions (MCQs)

1. Which one is greatest?

- (a)  $2^3$
- (b)  $3^2$
- (c)  $1^8$
- (d)  $4^2$

2. The exponent in the expression  $3^7$  is .....

- (a) 1
- (b) 7
- (c) 0
- (d) 3

3. The value of  $3^0$  is .....

- (a) 0
- (b) 3
- (c) 1
- (d) None of these

4. Multiplicative inverse of  $\frac{1}{7}$  is .....

- (a) 49
- (b) 5
- (c) 7
- (d) -14

5. Fill in the blank:  $a^m \div a^n = a$  to the power of..... Where m and n are natural number:

- (a) mn
- (b)  $m + n$
- (c)  $m - n$
- (d)  $m \div n$

6. The value of  $\frac{1}{3^2}$  is equal to .....

- (a)  $\frac{1}{9}$
- (b) 1
- (c) -6
- (d)  $\frac{1}{3}$

7. In simplified form  $(3^0 + 4^0 + 5^0)^0$  is equals to:

- (a) 12

- (b) 3
- (c) 12
- (d) 1

8. The approximate distance of moon from the earth is 384467000 m and in exponential form this distance can be written as .....

- (a)  $3.84467 \times 10^8$  m
- (b)  $384467 \times 10^{-8}$ m
- (c)  $384467 \times 10^{-9}$ m
- (d)  $3.84467 \times 10^{-3}$  m

9.  $7 \times 10^{-5}$  m is the standard form of which of the following .....

- (a) 0.0007 m
- (b) 0.000007 m
- (c) 0.0000007 m
- (d) 0.00007 m

10. The expression,  $(5^2 + 7^2 + 3^2)^0$  is equals to:

- (a)  $15^6$
- (b) -6
- (c) 1
- (d) 83

11. The value of  $(6^{-1} - 8^{-1})^{-1}$  is:

- (a)  $\frac{-1}{12}$
- (b) -2
- (c)  $\frac{1}{24}$
- (d) 24

$$\left\{ 6^{-1} + \left( \frac{3}{2} \right)^{-1} \right\}^{-1}$$

12. The value of \_\_\_\_\_ is:

- (a)  $\frac{2}{6}$
- (b)  $\frac{6}{5}$
- (c)  $\frac{6}{5}$
- (d) None of these

13. The value of  $\left[ \frac{-1}{2} \right]^{-6}$  is:

- (a) -64
- (b)  $\frac{-1}{64}$
- (c)  $\frac{1}{64}$
- (d)  $\frac{1}{64}$  64

14. The value of  $(3^2 - 2^2) \times \left( \frac{2}{3} \right)^{-3}$  is:

- (a)  $\frac{45}{8}$

(b)  $\frac{135}{8}$

(c)  $\frac{8}{135}$

(d)  $\frac{8}{45}$

$$\left(\frac{4}{9}\right)^4 \times \left(\frac{4}{9}\right)^{-7} = \left(\frac{4}{9}\right)^{2x-1}$$

15. If \_\_\_\_\_, then the value of x is:

- (a) -1
- (b)  $\frac{1}{2}$
- (c)  $\frac{-1}{2}$
- (d) None of these

### Answer these

1. Express 729 as a power of 3.
2. Simplify and write in exponential form of  $(-4)^{100} \times (-4)^{20}$
3. Simplify:

$$(3)^{-5} \times \left(\frac{1}{3}\right)^2 \times \left(\frac{1}{3}\right)^{-8}$$

4. Simplify:

$$\left[\left(\frac{2}{7}\right)^{-2}\right]^4 \times \left[\left(\frac{7}{2}\right)^4\right]^{-2}$$

5. If  $3^x = 243$ , then find the value of x.

6. Simplify:

$$\frac{5^{-3} \times 6^{-5} \times 81 \times 4}{3^{-7} \times 10^{-3}}$$

7. Find the value of x if  $(-3)^{3x+1} \times (-3)^4 = (-3)^8$

8. Express the height of bundle of 500 papers placed on each other if thickness of one paper is 0.0016 cm, in standard form.



## Section A

Question numbers 1 to 10 are of 1 mark each. Each question is provided with four choices out of which only one is correct. You have to choose the correct one.

- The additive inverse of  $pqr$  where  $p$ ,  $q$  and  $r$  are non-zero integers is:  
(a)  $pqr$  (b)  $(-p)(-q)r$  (c)  $\frac{p}{pqr}$  (d)  $(-p)(-q)(-r)$
- If an employee earns ₹ 45,000. What will be his new salary after an increase of 18%?  
(a) ₹ 8,100 (b) ₹ 36,900 (c) ₹ 45,000 (d) ₹ 53,100
- Which of the options gives the correct scientific form of 76,000,000,000 m in km?  
(a)  $76 \times 10^6$  (b)  $7.6 \times 10^7$  (c)  $0.76 \times 10$  (d)  $7.6 \times 10^{10}$
- Amongst the following, value of number different from others is:  
(a)  $7 \div 2.1$  (b)  $70 \div 21$  (c)  $7 \div 21$  (d)  $0.7 \div 0.21$
- The value of expression  $4\frac{2}{5} \div 3\frac{2}{5}$  is:  
(a)  $\frac{22}{17}$  (b)  $\frac{17}{22}$  (c)  $\frac{4}{3}$  (d)  $\frac{3}{4}$
- The value of  $(2^0)^0$  is:  
(a) 0 (b) 1 (c) 2 (d) not defined
- The value of the expression  $\frac{3^3 3^5}{(3^2)^4}$  is:  
(a)  $3^0$  (b)  $3^1$  (c)  $3^2$  (d)  $3^8$
- The sum of coefficients of all the variable terms in the expression  $x^2 - 2y^2 + 2z^2 - 1$  is:  
(a) 0 (b) 1 (c) -2 (d) 3
- A linear equation in one variable is:  
(a)  $3x + y = 4$  (b)  $3x - 1 = 5$  (c)  $2x + 5$  (d)  $\frac{1}{x} + x = 0$

10. An increase of 200% in Ramesh salary will change it from P to:  
(a) 200 P (b) 1.5 P (c) 2 P (d) 3 P

### Section B

Question numbers 11 to 17 carry 2 marks each.

11. Explain giving example whether multiplicative identity exists for integers or not.  
12. Represent  $2 \times \frac{1}{5}$  diagrammatically.  
13. If a dozen bananas cost ₹ 36, find the cost of 8 bananas.  
14. Write four rational numbers equivalent to  $\frac{2}{7}$ .  
15. Simplify  $\frac{2^3 \times 5^4 \times t^9}{10^3 \times t^3}$ .  
16. Subtract  $2x - 3y + 11$  from the sum of  $2x - 3y + 7$  and  $-5x - 7$ .  
17. The sum of three consecutive positive even integers is 48. Find the numbers.

### Section C

Question numbers 18 to 21 carry 3 marks each.

18. A building is 50 storey high. Each floor of the building is 6 m high. A lift moves 2 metres in every 3 seconds. How long will it take Saurabh to move from 4th floor to 26th floor?  
19. Steffi has 300 stamps of different countries.  $\frac{1}{5}$  of the stamps are from the U.K.,  $\frac{1}{3}$  are from other European countries and the remaining are from India. How many Indian stamps are there in Steffi's collection?  
20. The cost of 3 tables and 2 chairs is ₹ 820. If the cost of the table is ₹ 40 more than the chair, find the cost price of each.  
21. In how many years will a sum of money triple itself at the rate of 20% per annum simple interest?

### Section D

Question numbers 22 to 25 carry 5 marks each.

22. The denominator of a fraction is 5 times the numerator. If 2 is added to the numerator and subtracted from the denominator, then the fraction reduces to 1. Find the original fraction.  
23. 23 packets each containing 12 battery cells cost ₹ 1,932. Find the cost of 36 packets each containing 10 battery cells.  
24. Three pieces of ropes measuring 0.3 km, 30 m and 30 cm respectively are joined end to end to form a single rope. Find the cost of the single rope so formed if the cost of rope is ₹ 20 per metre.  
25. A certain sum of money doubles itself in 6 years. In how many years will it be three times at the same rate of simple interest?

OR

The length of a rectangle is 4 cm less than thrice the width. When the length is increased by 7 cm and the width is decreased by 2 cm, the perimeter equals 90 cm. Find the length and width of the rectangle.

## Section E

### Case Study

#### World Population Growth

Rapid population growth leads to a country with a young average age. Young population requires creation of new infrastructure including shelter, health care, and schools. A rapidly increasing population can crash the economy of a country into mass unemployment and underemployment. However, if the country has the resources to employ the people, increment in population can lead to rapid economic growth. On the other hand, if the country does not have enough resources, it cannot utilise its workforce productively. A rapidly increasing population reduces income, savings and investment.

The given table consists of population of India and its neighbouring countries in 2020. Use the table to answer the questions that follow.

Country	Approximate Population (2020)
India	1,380,004,385
China	1,439,323,776
Afghanistan	38,928,346
Pakistan	220,892,340
Bangladesh	168,689,383
Bhutan	771,608
Sri Lanka	21,413,249

- Express the population of all the countries in scientific notation.
- Arrange the countries in ascending order as per their population.

## Chapters 9 to 17

### Sample Question Paper 6

Maximum marks: 60

#### General Instructions

- All questions are compulsory.
- The question paper is divided into 5 sections.
  - Section A comprises of 10 multiple choice questions of 1 mark each, where you have to select one correct option.
  - Section B comprises of 7 questions of 2 marks each.
  - Section C comprises of 4 questions of 3 marks each.
  - Section D comprises of 4 questions of 5 marks each.
  - Section E comprises of 1 case study of 4 marks.

#### Section A

Question numbers 1 to 10 are of 1 mark each. Each question is provided with four choices out of which only one is correct. You have to choose the correct one.

- The height of a parallelogram having an area of  $36 \text{ cm}^2$  and base  $9 \text{ cm}$  is:  
(a)  $4 \text{ cm}$  (b)  $8 \text{ cm}$  (c)  $9 \text{ cm}$  (d)  $10 \text{ cm}$
- What is the complement of an angle of measure greater than  $45^\circ$ ?  
(a)  $> 45$  (b)  $< 45$  (c)  $= 45$  (d)  $90^\circ$
- Which of these quadrilateral has four lines of symmetry?  
(a) Parallelogram (b) Rhombus (c) Rectangle (d) Square
- The number of edges in a polyhedron having 8 faces and 12 vertices are:  
(a) 14 (b) 16 (c) 18 (d) 20
- The median of the observations 3, 2, 1, 2, 1, 5, 2 is:  
(a) 1 (b) 2 (c) 3 (d) 2.5
- Find the median of the first 99 natural numbers.  
(a) 48 (b) 49 (c) 50 (d) 51
- Two line segments are congruent if they are:  
(a) perpendicular (b) parallel (c) equal (d) unequal
- What is the area of a rhombus whose diagonals are  $d_1$  and  $d_2$ ?  
(a)  $\sqrt{d_1 d_2}$  (b)  $\frac{d_1 + d_2}{2}$  (c)  $d_1 \times d_2$  (d)  $\frac{1}{2} \times d_1 \times d_2$
- The number of parallel lines that can be drawn from a point outside the line to it is:  
(a) 0 (b) 1 (c) 2 (d) infinite
- Mode is the value of the data:  
(a) having maximum value (b) whose position is in the middle  
(c) occurring maximum number of times (d) occurring minimum number of times

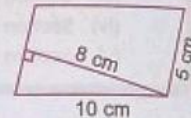
## Section B

Question numbers 11 to 17 carry 2 marks each.

11. If the circumference of a circular sheet is 154 m, find its radius and area.
12. Draw all the lines of symmetry of the following figure.



13. If the measure of one supplementary angle is twice the other then find the measure of each angle.
14. Find the mean score of a cricketer who scored the following runs in six innings.  
58, 79, 82, 0, 48, 63
15. Find the area of the parallelogram shown in the adjoining figure.

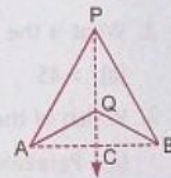


16. Find the area of a rhombus whose diagonals are 10 cm and 8 cm each.
17. If two cubes of dimensions 2 cm by 2 cm by 2 cm are placed side by side, what would be the dimensions of the resulting cuboid?

## Section C

Question numbers 18 to 21 carry 3 marks each.

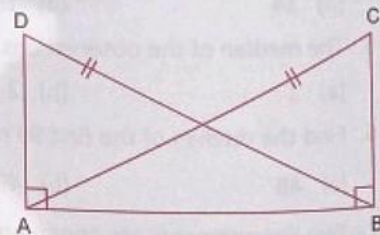
18. In the concave quadrilateral APBQ, PQ and AB are the diagonals. Given that  $AP = BP$ ,  $AQ = BQ$  and PQ is extended to meet AB at C.
  - (a) What is the relation between  $\vec{PQ}$  and AB?
  - (b) What is the relationship between QC and  $\angle AQB$ ?



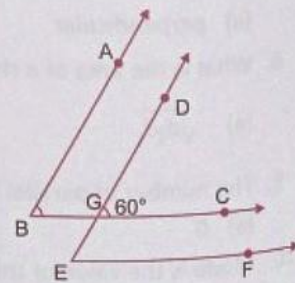
OR

In the given figure  $DA \perp AB$ ,  $CB \perp AB$  and  $AC = BD$ . State three pairs of equal parts in  $\triangle ABC$  and  $\triangle BAD$ . Which of the following options is correct?

- (a)  $\triangle ABC \cong \triangle BAD$                       (b)  $\triangle ABC \cong \triangle ABD$



19. The ages in years of 10 teachers in a school are: 32, 41, 28, 54, 35, 26, 26, 33, 38, 40
  - (a) What is the range of ages of the teachers?
  - (b) What is the mean age of the teachers?
  - (c) What is the modal age of the teachers?
20. In the given figure, the arms of two angles are parallel. If  $\angle DGC = 60^\circ$  then find:
  - (a)  $\angle ABG$                                       (b)  $\angle CGE$
  - (c)  $\angle GEF$
21. In a parallelogram the base and the corresponding altitude are in the ratio of 4 : 5 and its area is  $720 \text{ cm}^2$ . Find the measure of its base and altitude.



### Section D

Question numbers 22 to 25 carry 5 marks each.

22. Two paths each of width 5 m are running perpendicular to each other in the middle of a rectangular park 120 m by 60 m. Find the area of the path and also the cost of gravelling the path at the rate of ₹ 5 per metre square.
23. The data given below shows favourite sports of students in a university.

Favourite Sports	Baseball	Football	Cricket	Hockey	Swimming
Number of Students	28	48	96	32	40

Draw a bar graph on the basis of the above data.

24. Two poles 18 m and 13 m high stand upright in a playground. If their feet are 12 m apart, find the distance between their tops.
25. A horse is tethered to one corner of a rectangular field measuring 60 m by 40 m. The rope is 28 m long. How much area can the horse graze? (Take  $\pi = \frac{22}{7}$ )

### Section E

#### Case Study

#### Congruence Criterion

A key concept in architecture is the use of triangles. Triangles are known as the sturdiest figures in the architecture world. Some common applications of congruence of triangles is in construction of geodesic dome and truss bridge.

Observe the given image of the truss bridge and then answer the questions that follows.

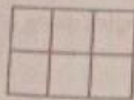


- (a) Given that the truss bridge is perfectly symmetrical along the line BD, prove that  $\triangle ABD \cong \triangle CBD$ .
- (b) If  $BD = 21$  m and  $AB = 29$  m, find the length of iron rods used to construct the part highlighted with red colour.

### Project Work

#### Visualising Solid Shapes

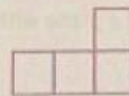
Using cubes make a figure whose three views are given below.



Front view



Side view



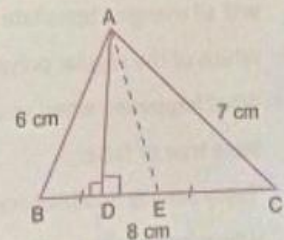
Top view

OR

#### Triangles

Draw a scalene  $\triangle ABC$  of dimensions 6 cm, 7 cm and 8 cm as shown in the figure given alongside on a tracing paper and cut it.

Using paper folding technique obtain its median AE and altitude AD. Show it to your teacher and discuss the concept used.





# TALENT TREE SCHOOL, MEHAM

Class: VIII

Subject: Mathematics

## WORKSHEET NO.- 1

Name of the Chapter : Rational Numbers

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### SECTION – A

Choose the correct option

- $(-1\frac{3}{5}) - (-\frac{7}{10}) = \underline{\hspace{2cm}}$ .  
a)  $-\frac{9}{10}$                       (b)  $-\frac{15}{10}$                       (c)  $-\frac{7}{50}$                       (d)  $\frac{11}{5}$
- The product of a non-zero rational number and its reciprocal is  $\underline{\hspace{2cm}}$ .  
a) 1                                      (b) 2                                      (c) 3                                      (d) 4
- A number which can be expressed as  $\frac{p}{q}$  where  $p$  and  $q$  are integers and  $q \neq 0$  is  $\underline{\hspace{2cm}}$ .  
a) natural number.      (b) whole number.      (c) integer.                      (d) rational number.
- The numerical expression  $\frac{3}{5} + \frac{-7}{5} = \frac{-4}{5}$  shows that  
a) rational numbers are closed under addition.  
b) rational numbers are not closed under addition.  
c) rational numbers are closed under multiplication.  
d) addition of rational numbers is not commutative.
- The additive inverse of  $\frac{-7}{5}$  is  $\underline{\hspace{2cm}}$ .  
(a)  $\frac{-5}{7}$                       (b)  $\frac{7}{5}$                       (c)  $\frac{-17}{5}$                       (d)  $\frac{-7}{15}$
- The reciprocal of 0 is  $\underline{\hspace{2cm}}$ .  
a) 1                                      (b) -1                                      (c) 0                                      (d) Not defined
- The multiplicative inverse of  $\frac{1}{8}$  is  
(a)  $-\frac{1}{8}$                       (b) 1                                      (c) 8                                      (d) -8
- The product of two rational numbers is  $-\frac{28}{81}$ . If one of the numbers is  $\frac{14}{27}$  then the other one is  
(a)  $\frac{-2}{3}$                       (b)  $\frac{2}{3}$                                       (c)  $\frac{3}{2}$                                       (d)  $-\frac{3}{2}$

9. Write the reciprocal of  $(^{-4/9} \times 3/5) + (1^{1/2} \times 2/3)$ .

- (a)  $12/5$                       (b)  $33/5$                       (c)  $17/5$                       (d)  $5/17$  10.

Divide the sum of  $11/5$  and  $19/7$  by the product of  $^{-3/5}$  and  $1/2$ , then we get

- (a)  $19^{3/5}$                       (b)  $-16^{8/21}$                       (c)  $33/7$                       (d)  $323/21$

### SECTION – B

11. What should be added to  $-5/4$  to get  $-1$ ?  
12. What should be subtracted from  $-5/4$  to get  $-1$ ? 13. Find the additive inverse of a)  $-5/9$                       b)  $3$   
14. What is the Multiplicative identity for rational numbers? 15. Find the multiplicative inverse of a)  $7/9$                       b)  $1/3$   
16. How many reciprocals does zero have?  
17. What is the reciprocal of  $a$ ?  
18. What is the product of  $7/8$  and  $(-4/21)$ ?  
19. What is the product of  $(-7/8)$  and  $4/21$ ?  
20. Multiply the negative of  $2/3$  by the inverse of  $9/7$ .

### SECTION – C

21. Find  $\frac{-2}{3} \times \frac{3}{5} + \frac{5}{2} - \frac{3}{5} \times \frac{1}{6}$  using distributive property.  
22. Is  $\frac{8}{9}$  the multiplicative inverse of  $(-1 \frac{1}{8})$ ? Why or Why not?  
23. Is  $0.4$  the multiplicative inverse of  $4 \frac{1}{4}$ ? Why or why not?  
24. Find the multiplicative inverse of a)  $-7/9$                       b)  $1/(-3)$                       c)  $-3$   
25. If the cost of  $4\frac{1}{2}$  litres of milk is ₹ $89\frac{1}{2}$ , find the cost of 1 litre of milk.  
26. The additive inverse of  $\frac{-5}{7}$  is ----- and multiplicative inverse of  $\frac{(-5)}{8} \times \frac{2}{3}$  is -----  
27. Multiply  $6/13$  by reciprocal of  $(-7/162)$ .  
28. Divide the sum of  $^{-5/7}$  and  $^{-3/2}$  by the product of  $9/2$  and  $3/7$ .  
29. Find  $3/7 + (-6/11) + (-8/21) + (5/22)$   
30. (i) What should be subtracted from  $-2$  to get  $3/8$ ?  
(ii) What should be added to  $-2$  to get  $3/8$ ?

### SECTION – D

31. Simplify  $3\frac{4}{5} \times 2\frac{5}{12} + (-1\frac{1}{6})$ .
32. If  $a = \frac{-2}{3}$ ,  $b = \frac{2}{-5}$  and  $c = \frac{-3}{-4}$ . Verify that  $a(b + c) = (a \times b) + (a \times c)$
33. Vijaya had a certain amount of money in her purse. She spent ₹ 20 in the school canteen,  $\frac{1}{4}$  bought a gift worth ₹ 35 and gave ₹ 40 to her friend. How much she have to begin with?  $\frac{3}{4}$   $\frac{1}{2}$
34. Verify that  $x \times (y \times z) = (x \times y) \times z$ . Taking  $x = \frac{-3}{4}$ ,  $y = \frac{2}{3}$  and  $z = \frac{4}{5}$ ,
35. Using appropriate properties find:
- (i)  $-\frac{2}{3} \times \frac{3}{5} + \frac{5}{2} - \frac{3}{5} \times \frac{1}{6}$
- (ii)  $\frac{2}{5} \times \left(\frac{-3}{7}\right) - \frac{1}{6} \times \frac{3}{2} + \frac{1}{14} \times \frac{2}{5}$

### SECTION – E

36. (i) A window curtain is  $30\frac{1}{5}$  cm long has a hem of  $2\frac{4}{5}$  cm. How long will the skirt be if the hem is let down?
- (ii) One-third of a group of people are men. If the number of women is 200 more than the men, find the total number of people.
- 37 (i) Write  $\frac{2}{3}$ ,  $-\frac{4}{9}$ ,  $-\frac{8}{11}$  in ascending order.
- (ii) Write  $\frac{2}{3}$ ,  $-\frac{4}{9}$ ,  $-\frac{8}{11}$  in descending order.
38. Fill in the blanks:
- (i) The product of a number and its reciprocal is \_\_\_\_\_.
- (ii) The rational number \_\_\_\_\_ has no reciprocal.
- (iii) The reciprocal of the reciprocal of a number (x) is \_\_\_\_\_.
- (iv) The rational number \_\_\_\_\_ is neither positive nor negative.
- (v) \_\_\_\_\_ is the only rational number which is equals its additive inverse.
39. Write:
- (i) A rational number which has no reciprocal.
- (ii) A rational number whose product with a given rational number is equal to the given rational number.

(iii) A rational number which is equal to its reciprocal.

(iv) Which property allows us to compute

$$\frac{1}{3} \times \left( 6 \times \frac{4}{3} \right) \text{ as } \left( \frac{1}{3} \times 6 \right) \times \frac{4}{3}$$

(v) Cost  $\frac{2}{5}$  of 3 metre of cloth is ₹88<sup>1</sup>. What is the cost of 1 metre of cloth? 2

40. (i) Divide the sum of  $\frac{3}{7}$  and  $-5\frac{1}{4}$  by  $-\frac{1}{4}$ .

(ii) The product of two rational numbers is - 9. If one of these numbers is  $-7\frac{1}{4}$ , find the other.

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