

Exponents and Powers

Mathematics · Class 8 · Topic-wise Practice Worksheet

TIME 45 minutes	QUESTIONS 18	TOTAL MARKS 24	MAX. SCORE ____ / 24
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Name: _____ Class/Sec: _____ Date: _____

INSTRUCTIONS

- There are **18 questions** in this worksheet. All questions are compulsory.
- Each question has four options (A), (B), (C) and (D). Exactly **one** option is correct.
- Questions 1–15 carry **1 mark** each. Questions 16–18 (Achievers Section) carry **3 marks** each.
- There is no negative marking. Use of a calculator is **not** allowed.
- Rough work may be done on the blank space at the side of each page.

Section A — Mathematical Reasoning

Q1–Q8 · 1 mark each

- The value of 3^{-2} is _____.
 (A) $\frac{1}{9}$ (B) -6
 (C) -9 (D) $\frac{1}{6}$
- $2^5 \times 2^3 =$ _____.
 (A) 2^{15} (B) 4^8
 (C) 256 (D) 64
- For any non-zero number a , the value of a^0 is _____.
 (A) 0 (B) 1
 (C) a (D) Not defined
- $(3^2)^3 =$ _____.
 (A) 729 (B) 243
 (C) 3^5 (D) 3^8
- The standard form of 0.000045 is _____.
 (A) 45×10^{-6} (B) 4.5×10^5
 (C) 4.5×10^{-5} (D) 0.45×10^{-4}
- $5^{-1} + 2^{-1} =$ _____.
 (A) $\frac{1}{7}$ (B) 7
 (C) $\frac{10}{7}$ (D) $\frac{7}{10}$

7. The value of $(\frac{2}{3})^{-2}$ is _____.

(A) $\frac{9}{4}$

(B) $\frac{4}{9}$

(C) $\frac{-4}{9}$

(D) $\frac{-9}{4}$

8. $10^6 \div 10^4 =$ _____.

(A) 10

(B) 1000

(C) 100

(D) 10^{24}

Section B — Everyday Mathematics and Reasoning

Q9–Q15 · 1 mark each

9. In the table below, one entry has been written **incorrectly**. Which row is it?

Row	Usual form	Standard form
(A)	5,60,00,000	5.6×10^7
(B)	0.0003	3×10^{-4}
(C)	0.000000012	1.2×10^{-8}
(D)	92,00,000	9.2×10^5

Table 9.1 — Numbers in standard form

(A) Row (A)

(B) Row (B)

(C) Row (C)

(D) Row (D)

10. The number 1.5×10^8 written in usual form is _____.

(A) 1,50,000

(B) 15,00,000

(C) 1,50,00,000

(D) 15,00,00,000

11. The diameter of a human red blood cell is about 0.000007 m. In standard form this is _____.

(A) 7×10^{-6} m

(B) 7×10^6 m

(C) 0.7×10^{-5} m

(D) 70×10^{-7} m

12. The value of $(-1)^{50} \times (-1)^{51}$ is _____.

(A) 1

(B) 0

(C) -1

(D) 101

13. If $2^x = 32$, then $x =$ _____.

(A) 4

(B) 5

(C) 6

(D) 16

14. The value of $(3^{-4} \times 3^7) \div 3^2$ is _____.

(A) 1

(B) 3

(C) 9

(D) 27

15. Which of the following has the **greatest** value?

(A) 2^3

(B) 1^4

(C) 4^1

(D) 3^2

16. Consider the following statements.

- (i) 2^{-3} is a negative number.
- (ii) $(a \times b)^n = a^n \times b^n$ for all non-zero a and b .
- (iii) 0^0 is not defined.

Which of the statements is/are correct?

- (A) (i) and (ii) only
- (B) (ii) and (iii) only
- (C) (i) and (iii) only
- (D) All three

17. Find x if $(\frac{5}{3})^{-2} \times (\frac{5}{3})^{-5} = (\frac{5}{3})^{2x-1}$.

- (A) -3
- (B) 3
- (C) -4
- (D) 4

18. Evaluate $(\frac{1}{2})^{-2} + (\frac{1}{3})^{-2} + (\frac{1}{4})^{-2}$.

- (A) 9
- (B) 29
- (C) $\frac{29}{144}$
- (D) -29

Answer Key

1	A	2	C	3	B	4	A	5	C
6	D	7	A	8	C	9	D	10	D
11	A	12	C	13	B	14	B	15	D
16	B	17	A	18	B				

Solutions

1. Answer: (A) $\frac{1}{9}$

A negative exponent means the reciprocal: $a^{-n} = 1 \div a^n$.

So $3^{-2} = 1 \div 3^2 = \frac{1}{9}$. Note that it is not negative.

2. Answer: (C) 256

When multiplying powers with the same base, add the exponents:

$$2^5 \times 2^3 = 2^{5+3} = 2^8 = 256.$$

3. Answer: (B) 1

Since $a^n \div a^n = a^{n-n} = a^0$, and any non-zero number divided by itself is 1, we get $a^0 = 1$.

4. Answer: (A) 729

For a power of a power, multiply the exponents:

$$(3^2)^3 = 3^{2 \times 3} = 3^6 = 729.$$

5. Answer: (C) 4.5×10^{-5}

Move the decimal point 5 places to the right to get 4.5, so the exponent is -5 :

$0.000045 = 4.5 \times 10^{-5}$. In standard form the first factor must lie between 1 and 10, which rules out the last two options.

6. Answer: (D) $\frac{7}{10}$

$$5^{-1} + 2^{-1} = \frac{1}{5} + \frac{1}{2} = \frac{2}{10} + \frac{5}{10} = \frac{7}{10}.$$

7. Answer: (A) $\frac{9}{4}$

A negative exponent turns the fraction upside down:

$$\left(\frac{2}{3}\right)^{-2} = \left(\frac{3}{2}\right)^2 = \frac{9}{4}.$$

8. Answer: (C) 100

When dividing powers with the same base, subtract the exponents:

$$10^6 \div 10^4 = 10^{6-4} = 10^2 = 100.$$

9. Answer: (D) Row (D)

$92,00,000 = 9200000$, which has 7 digits, so the decimal point moves 6 places: 9.2×10^6 , not 10^5 . Checking the others:

$5.6 \times 10^7 = 56000000$ ✓, $3 \times 10^{-4} = 0.0003$ ✓, and $1.2 \times 10^{-8} = 0.000000012$ ✓. So row (D) is wrong.

10. Answer: (D) 15,00,00,000

Moving the decimal point 8 places to the right gives 150000000, that is **15,00,00,000** (fifteen crore). This is roughly the distance in kilometres from the earth to the sun.

11. Answer: (A) 7×10^{-6} m

The decimal point must move 6 places to the right to give 7, so the exponent is -6 :

$0.000007 = 7 \times 10^{-6}$ m. The last two options are numerically equal but are not in standard form, since the first factor must be between 1 and 10.

12. Answer: (C) -1

(-1) raised to an even power is 1 and to an odd power is -1 .

$$\text{So } (-1)^{50} \times (-1)^{51} = 1 \times (-1) = -1.$$

(Alternatively, add the exponents: $(-1)^{101} = -1$.)

13. Answer: (B) 5

Write 32 as a power of 2: $32 = 2 \times 2 \times 2 \times 2 \times 2 = 2^5$.

So $2^x = 2^5$, giving $x = 5$.

14. Answer: (B) 3

Numerator: $3^{-4} \times 3^7 = 3^{-4+7} = 3^3$.

Then $3^3 \div 3^2 = 3^{3-2} = 3^1 = 3$.

15. Answer: (D) 3^2

Work each one out: $2^3 = 8$, $3^2 = 9$, $4^1 = 4$ and $1^4 = 1$. The greatest is $3^2 = 9$. Note that a larger base does not always give a larger value.

16. Answer: (B) (ii) and (iii) only

Statement (i) is false — a negative exponent gives a reciprocal, not a negative number: $2^{-3} = \frac{1}{8}$, which is positive.

Statement (ii) is true, for example $(2 \times 3)^2 = 36 = 2^2 \times 3^2$. Statement (iii) is true; 0^0 is left undefined. Hence **(ii) and (iii)**.

17. Answer: (A) -3

Add the exponents on the left:

$$\left(\frac{5}{3}\right)^{-2} \times \left(\frac{5}{3}\right)^{-5} = \left(\frac{5}{3}\right)^{-7}.$$

Since the bases are equal, the exponents must be equal:

$$2x - 1 = -7$$

$$2x = -6, \text{ so } x = -3.$$

18. Answer: (B) 29

Each negative exponent turns the fraction over:

$$\left(\frac{1}{2}\right)^{-2} = 2^2 = 4$$

$$\left(\frac{1}{3}\right)^{-2} = 3^2 = 9$$

$$\left(\frac{1}{4}\right)^{-2} = 4^2 = 16$$

$$\text{Sum} = 4 + 9 + 16 = 29.$$