

1 Choose the correct answer.

- (1) Which of the following equals $3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$?
- (A) 3×7 (B) 7^3 (C) 3^7 (D) $3 + 7$
- (2) If $7^n \times a^m = a \times 7 \times a \times a \times 7$, what is the value of $n + m$?
- (A) 3 (B) 2 (C) 6 (D) 5
- (3) Which of the following equals $(-9)^2$?
- (A) -81 (B) -18 (C) 18 (D) 81
- (4) Which of the following equals $(-2)^3$?
- (A) -6 (B) 6 (C) 8 (D) -8
- (5) Which of the following equals $(-3)^4$?
- (A) -12 (B) -7 (C) 81 (D) -81
- (6) Which of the following equals $(2)^{-4}$?
- (A) -16 (B) 16 (C) $\frac{1}{8}$ (D) $\frac{1}{16}$
- (7) Which of the following equals $(-5)^{-4}$?
- (A) -5^{-4} (B) 5^4 (C) $(\frac{1}{5})^{-4}$ (D) $(\frac{1}{5})^4$
- (8) Which of the following is the additive inverse of the number 4^{-3} ?
- (A) $(-4)^3$ (B) $(-4)^{-3}$ (C) 4^3 (D) 4^{-3}
- (9) Which of the following is the additive inverse of 5^0 ?
- (A) 1 (B) 5 (C) -5 (D) $-(5)^0$
- (10) Which of the following is the additive inverse of 5^{-2} ?
- (A) 5^2 (B) -5^2 (C) -5^{-2} (D) $\frac{1}{25}$
- (11) Which of the following is the multiplicative inverse of the number $(-1)^3$?
- (A) $(-1)^3$ (B) $(-1)^2$ (C) 1^3 (D) 1^2
- (12) Which of the following is the multiplicative inverse of the number $(-1)^{45}$?
- (A) $(-1)^{43}$ (B) $(-1)^{44}$ (C) $(1)^{43}$ (D) $(1)^{44}$

(13) $5a^0 - (5a)^0 = \dots\dots\dots$

- (A) 0 (B) 4 (C) 5 (D) 10

(14) $7x^0 + (2x)^0 = \dots\dots\dots$

- (A) 7 (B) 8 (C) $7x^2$ (D) 9

(15) If $x = -\frac{1}{2}$, $y = 3$, what is the value of x^y ?

- (A) $\frac{1}{4}$ (B) $-\frac{1}{4}$ (C) $-\frac{1}{8}$ (D) 8

(16) Which of the following equals $a^{-1} \times a^3$?

- (A) a^2 (B) a^4 (C) $\frac{1}{a^2}$ (D) $\frac{1}{a^3}$

(17) If $2^4 \times a = 2^{20}$, what is the value of a ?

- (A) 2^{24} (B) 2^{16} (C) 2^5 (D) 2

(18) If $2^{-5} \times a = 1$, what is the value of a ?

- (A) 5^2 (B) 2^5 (C) 2^{-5} (D) 5^{-2}

(19) If $5^{-3} \times a = 1$, what is the value of a ?

- (A) 5^2 (B) 5^3 (C) 5^0 (D) 5^{-3}

(20) $3^2 \times 2^2 = \dots\dots\dots$

- (A) 5^4 (B) 6^4 (C) 6^2 (D) 6^3

(21) Which of the following expresses $\frac{y^{-2}}{y^{-6}}$ in the simplest form?

- (A) y^4 (B) $\frac{1}{y^4}$ (C) y^8 (D) $\frac{1}{y^8}$

(22) $\frac{p^{-1}}{p^{\dots}} = p^{10}$

- (A) 9 (B) -9 (C) 11 (D) -11

(23) $\left(\frac{1}{4}\right)^0 + \frac{1}{4} = \dots\dots\dots$

- (A) $\frac{1}{4}$ (B) $\frac{3}{4}$ (C) $\frac{5}{4}$ (D) $\frac{2}{4}$

- (24) Half of the number 2^{10} is
- (A) 2^5 (B) 1^5 (C) 2^8 (D) 2^9
- (25) Half of the number 2^x is
- (A) 1^x (B) $\left(\frac{1}{2}\right)^x$ (C) 2^{x+1} (D) 2^{x-1}
- (26) Fourth of the number 2^{10} is
- (A) 2^5 (B) 1^5 (C) 2^8 (D) 2^9
- (27) A quarter of the number 2^{20} is
- (A) 2^5 (B) 2^4 (C) 2^{18} (D) 2^{19}
- (28) Three times the number 3^5 is
- (A) 3^4 (B) 95 (C) 3^6 (D) 95
- (29) Which of the following equals a third of the number 3^x ?
- (A) 1^x (B) $\left(\frac{1}{3}\right)^x$ (C) 3^{x+1} (D) 3^{x-1}
- (30) Which of the following equals $2^a + 2^a$?
- (A) 4^a (B) 2^a (C) 2^{a+1} (D) 2^{a+1}
- (31) Which of the following equals $4^{10} + 4^{10} + 4^{10} + 4^{10}$?
- (A) 4^{10} (B) 4^{40} (C) 2^9 (D) 4^{11}
- (32) Which of the following equals $4^{-1} + 4^{-1} + 4^{-1} + 4^{-1}$?
- (A) 4^{-4} (B) 4^4 (C) 1 (D) 16
- (33) Which of the following equals $4^a + 4^a + 4^a + 4^a$?
- (A) 4^{4a} (B) 16^{4a} (C) 4^{a+1} (D) 4^{a+4}
- (34) Which of the following is equal to $|-3a^{-2}|$ in its simplest form?
- (A) $3a^2$ (B) $\frac{3}{a^2}$ (C) $\frac{27}{a^2}$ (D) $27a^2$
- (35) If $a = b$, then $\left(\frac{x}{3y}\right)^{b-a} = \dots$
- (A) $\frac{x}{3y}$ (B) $\frac{3y}{x}$ (C) 1 (D) 0

- (36) Which of the following numbers is written in scientific notation?
(A) $1.5 \times 10^{4.5}$ (B) 31.5×10^5 (C) 15×10^5 (D) 3.15×10^5
- (37) Which of the following numbers is not in scientific notation?
(A) 2.35×10^7 (B) 23.5×10^6 (C) 2.35×10^6 (D) 3.5×10^{-6}
- (38) Which of the following expresses the number 8 million in scientific notation?
(A) 8×10^7 (B) 8×10^6 (C) 8×10^{-6} (D) 8×10^8
- (39) Which of the following equals 0.000073?
(A) 7.3×10^6 (B) 7.3×10^5 (C) 7.3×10^{-5} (D) 7.3×10^{-6}
- (40) Which of the following equals $6,000 \times 50$?
(A) 300×10^2 (B) 30×10^5 (C) 3×10^5 (D) 30×10^3
- (41) If $6.3 \times 10^n = 0.00063$, what is the value of n?
(A) -4 (B) -3 (C) 3 (D) 4
- (42) If $39 \times 10^{-8} = k \times 10^{-7}$, what is the value of k?
(A) 39 (B) 3.9 (C) 0.39 (D) 0.039
- (43) If the number $y \times 10^{-9}$ is written in scientific notation, what could be the value of y?
(A) 0.6 (B) 6 (C) 60 (D) 600
- (44) Which of the following is the largest?
(A) 6.3×10^5 (B) 9.8×10^4 (C) 5.2×10^5 (D) 7.3×10^4
- (45) Which of the following is the smallest?
(A) 0.6×10^5 (B) 0.25×10^5 (C) 7×10^4 (D) 17.5×10^4
- (46) What is the value of $\sqrt{(-5)^2}$?
(A) -5 (B) 5 (C) ± 5 (D) 25
- (47) Which of the following equals $\sqrt{16x^2}$?
(A) $4x$ (B) $-4x$ (C) $4x^2$ (D) $4|x|$
- (48) Which of the following equals $\sqrt{9x^2}$?
(A) $3x$ (B) $9x$ (C) $3x^2$ (D) $3|x|$

(49) Which of the following equals $2x^{-2}$?

- (A) $2x^2$ (B) $\frac{1}{2}x^2$ (C) $\frac{1}{2x^2}$ (D) $\frac{2}{x^2}$

(50) Which of the following equals $2x^{-1}$?

- (A) $2x$ (B) $\frac{1}{2}x$ (C) $\frac{1}{2x}$ (D) $\frac{2}{x}$

(51) What is the multiplicative inverse of the number $\sqrt{\frac{9}{25}}$ in simplest form?

- (A) $\frac{-3}{5}$ (B) $\frac{3}{5}$ (C) $\frac{-5}{3}$ (D) $\frac{5}{3}$

(52) What is the additive inverse of the number $-\sqrt{0.16}$ in simplest form?

- (A) -0.4 (B) 0.4 (C) -0.8 (D) 0.8

(53) If a and b are the square roots of the number c, what is the value of $a + b$?

- (A) $2a$ (B) $2b$ (C) 1 (D) 0

(54) If a and b are the square roots of the number 4, what is the value of $a + b$?

- (A) $2a$ (B) $2b$ (C) 1 (D) 0

(55) If $\sqrt{x} = 5$, what is the value of x?

- (A) 10 (B) 20 (C) 25 (D) ± 25

(56) If $x = \sqrt{\frac{1}{9}}$, what is the value of x^3 ?

- (A) $\frac{1}{3}$ (B) $\frac{1}{9}$ (C) $\frac{1}{27}$ (D) $\frac{1}{81}$

(57) $\sqrt{4 + \dots} = 4$

- (A) 0 (B) 4 (C) 12 (D) 16

(58) $\sqrt{36} + \sqrt{16} = \sqrt{\dots}$

- (A) 10 (B) 52 (C) 100 (D) 120

(59) If $a = -\frac{1}{2}$ and $b = -\frac{9}{8}$, then $\sqrt{(ab)} = \dots\dots\dots$

- (A) $\frac{9}{8}$ (B) $\frac{9}{16}$ (C) $\frac{3}{4}$ (D) $-\frac{3}{4}$

(60) What is the value of $\sqrt[3]{64}$?

- (A) 2 (B) 4 (C) 8 (D) 64

(61) What is the value of $\sqrt[3]{0.008}$ in simplest form?

- (A) $\frac{1}{2}$ (B) 0.002 (C) $\frac{8}{10}$ (D) $\frac{1}{5}$

(62) If $x^3 = 27$, what is the value of x ?

- (A) -3 (B) 3 (C) ± 3 (D) -9

(63) If $\sqrt[3]{b} = -8$, what is the value of b ?

- (A) 2 (B) -2 (C) 64 (D) -512

(64) If $-2a^3 = -2$, what is the value of \sqrt{a} ?

- (A) 1 (B) -1 (C) ± 1 (D) 2

(65) If $-\sqrt{25} = \sqrt[3]{y}$, what is the value of y ?

- (A) -5 (B) 5 (C) -125 (D) 125

(66) Which of the following equals $\sqrt[3]{(8)^2}$?

- (A) -4 (B) -2 (C) 2 (D) 4

(67) $|\sqrt[3]{-125}| = \sqrt{\dots}$?

- (A) 5 (B) -5 (C) 25 (D) -25

(68) If $a = 5^3$, what is the value of $\sqrt[3]{a}$?

- (A) 3 (B) 5 (C) 25 (D) 125

(69) If $\sqrt{x} = 27$, what is the value of $\sqrt[3]{x}$?

- (A) 3 (B) 9 (C) 27 (D) 81

(70) If $x^2 = 64$, what is the value of $\sqrt[3]{x}$?

- (A) 2 (B) -2 (C) 4 (D) ± 2

(71) $\sqrt[3]{\sqrt{64}} = \dots$

- (A) 2 (B) 4 (C) 8 (D) 64

(72) $\sqrt[3]{64 - \dots} = 3$

- (A) 9 (B) 27 (C) 37 (D) 4

- (73) What is the inequality that expresses that the temperature x is less than 40° ?
- (A) $x < 40^\circ$ (B) $x > 40^\circ$ (C) $x \leq 40^\circ$ (D) $x \geq 40^\circ$
- (74) Which of the following inequalities expresses the following situation: "an accountant with at least 5 years of experience is required"?
- (A) $x > 5$ (B) $x \geq 5$ (C) $x < 5$ (D) $x \leq 5$
- (75) Which of the following inequalities expresses the following situation: "Omar needs at least two hours to complete the homework"?
- (A) $x > 2$ (B) $x \geq 2$ (C) $x < 2$ (D) $x \leq 2$
- (76) What is the inequality that expresses that twice the number x is less than 5?
- (A) $x + 2 < 5$ (B) $x - 2 > 5$ (C) $2x < 5$ (D) $2x > 5$
- (77) If $x - 1 > 4$, which of the following could be the value of X?
- (A) 3 (B) 4 (C) 5 (D) 7
- (78) If $x - 2 < 5$, which of the following could be the value of X?
- (A) 6 (B) 7 (C) 8 (D) -9
- (79) Which of the following inequalities has $x = -7$ as one of its solutions in \mathbb{Z} ?
- (A) $x > -7$ (B) $x < -7$ (C) $x > -6$ (D) $-x \geq -7$
- (80) Which of the following inequalities has $x = -4$ as one of its solutions in \mathbb{Q} ?
- (A) $x - 2 \geq -4$ (B) $2x > -8$ (C) $x + 2 > -3$ (D) $-x > 4$
- (81) Which of the following is equivalent to the inequality $-x > -1$?
- (A) $x < -1$ (B) $x < 1$ (C) $x > 1$ (D) $x > -1$
- (82) If $-x < 5$, then which of the following is correct?
- (A) $2x = -4$ (B) $2x > -8$ (C) $x + 2 > -3$ (D) $-x > 4$
- (83) If $x \in \mathbb{N}$, then what is the solution set for the inequality $-x > 3$?
- (A) $\{4, 5, 6, \dots\}$ (B) $\{-4, -5, \dots\}$ (C) $\{-3\}$ (D) \emptyset
- (84) If $x > y$, then $\frac{1}{x}$ $\frac{1}{y}$ where $x \neq 0, y \neq 0$.
- (A) $>$ (B) $<$ (C) $=$ (D) \geq

(85) $(2x)(3x) = \dots\dots\dots$

- (A) $5x$ (B) $6x$ (C) $5x^2$ (D) $6x^2$

(86) $(-3x^2)(4x^3) = \dots\dots\dots$

- (A) $-12x^5$ (B) $12x$ (C) $-12x^6$ (D) $12x^5$

(87) $(3a^4b)(5a^2b^2)(2a^3) = \dots\dots\dots$

- (A) $60 a^{11} b^3$ (B) $30a^{10} b^2$ (C) $15a^{10} b^3$ (D) $30 a^9 b^3$

(88) $2(x + 3) = \dots\dots\dots$

- (A) $2x^2 + 6x$ (B) $2x + 1$ (C) $2x + 6$ (D) $6x^2$

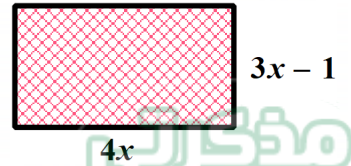
(89) $x(x - 1) + x = \dots\dots\dots$

- (A) $x(2x - 1)$ (B) $2x^2$ (C) x^2 (D) $x^2 - x$

(90) If $a(3x - 1) = 12x^2 - 8x$, then what is the value of a?

- (A) $3x$ (B) 4 (C) $4x$ (D) $4x^2$

(91) What is the area of the given rectangle?



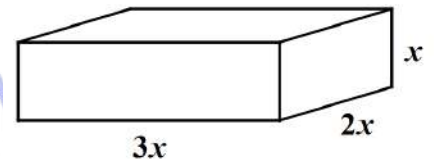
- (A) $12x - 1$ (B) $12x^2 - 4x$ (C) $12x + 4x$ (D) $(12x)(4x)$

(92) If the edge length of a cube is $2b$, then what is the volume of this cube?

- (A) $4b^2$ (B) $2b^3$ (C) $3b^3$ (D) $8b^3$

(93) What is the volume of the rectangular prism given?

- (A) $6x^3$ (B) $6x$ (C) 65 (D) $5x^2$



2

Answer the following questions

1) Simplify to its simplest form:

a) $\frac{a \times a^{-3} \times a^8}{a^5 \times a^{-4}}$

.....

.....

b) $\frac{x^{-3} \times x^5 \times (-x)^4}{x^2 \times x^{-4} \times x^6}$ then find the numerical value when $x = 2$

.....

.....

2) Write the result in scientific notation:

a) $(3 \times 10^4) \times (18 \times 10^9)$

.....

.....

b) $(5 \times 10^4) \div (2.5 \times 10^{-3})$

.....

.....

c) $(5.8 \times 10^3) + (3.2 \times 10^2)$

.....

.....

d) $(7.2 \times 10^{13}) - (3.4 \times 10^{12})$

.....

.....

3) Arrange the following numbers in an ascending order:

$7 \times 10^5, 7.8 \times 10^8, 1.1 \times 10^8, 54 \times 10^4$

.....

.....

4) If a and b are the two square roots of c where $c \neq 0$, complete the following:

a) $a + b = \dots\dots\dots$

b) $\frac{a}{b} = \dots\dots\dots$

5) A cube has a volume of 512 cubic centimeters, what is the length of its edge?

.....

.....

6) A cube has a volume of 512 cubic centimeters, Find the lateral area?

.....

.....

7) A cube has a volume of 512 cubic centimeters, Find the total (surface) area?

.....

.....

8) A square has an area of 0.49 square centimeters, Find the perimeter?

.....

.....

ENG. ESLAM EMAM

9) Find the solution set for each of the following equations in \mathbb{Z} ?

a) $2x^2 + 1 = 33$

.....

.....

b) $2x^2 + 1 = 51$

.....

.....

c) $3x^3 - 7 = 2x^3 + 20$

.....

.....

d) $(x - 2)^3 + 3 = -61$

.....

.....

10) Find the solution set for each of the following inequalities?

a) $1 - 3x < 7 \mathbb{Z}$

.....

.....

b) $2(x - 5) - 3 \geq 15 \mathbb{Q}$

.....

.....

c) $4x + 3 \geq 3x - 2 \mathbb{Z}$

.....

.....

d) $5 - 3x < 2(x + 1) \mathbb{Q}$

.....

.....

9) Find the solution set for each of the following equations in \mathbb{Z} ?

a) $2x^2 + 1 = 33$

.....

.....

b) $2x^2 + 1 = 51$

.....

.....

c) $3x^3 - 7 = 2x^3 + 20$

.....

.....

d) $(x - 2)^3 + 3 = -61$

.....

.....

10) Find the solution set for each of the following inequalities?

a) $1 - 3x < 7$ in \mathbb{Z}

.....

.....

b) $2(x - 5) - 3 \geq 15$ in \mathbb{Q}

.....

.....

c) $4x + 3 \geq 3x - 2$ in \mathbb{Z}

.....

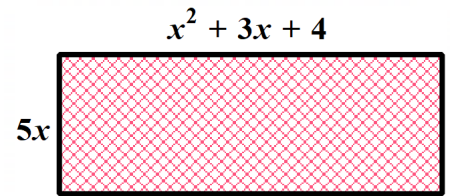
.....

d) $5 - 3x < 2(x + 1)$ in \mathbb{Q}

.....

.....

11) Find the area of the rectangle in terms of x , then calculate the numerical value of the area when $x = 2$

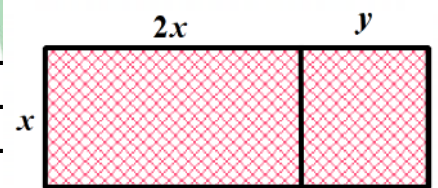


.....

.....

.....

12) Find in the simplest form the algebraic expression that represents the area of shaded part

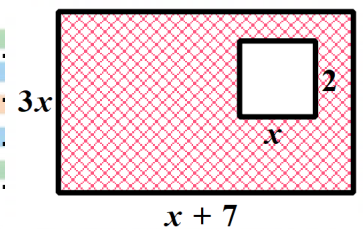


.....

.....

.....

13) Find in the simplest form the algebraic expression that represents the area of shaded part

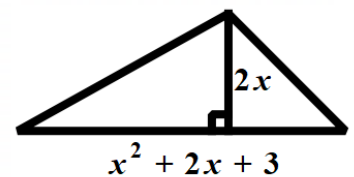


.....

.....

.....

14) Find the area of the triangle ABC in terms of x , then calculate the numerical value of the area when $x = 3$



.....

.....

.....