

AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS IX

ANNUAL EXAMINATIONS 2021

General Mathematics

Time: 1 hour 40 minutes Marks: 50

INSTRUCTIONS

1. Read each question carefully.
2. Answer the questions on the separate answer sheet provided. DO NOT write your answers on the question paper.
3. There are 100 answer numbers on the answer sheet. Use answer numbers 1 to 50 only.
4. In each question, there are four choices A, B, C, D. Choose ONE. On the answer grid, black out the circle for your choice with a pencil as shown below.

Correct Way	Incorrect Ways
1 ☐ A ☐ B ☒ C ☐ D	1 ☐ A ☐ B ☒ C ☐ D
	2 ☐ A ☐ B ☒ C ☐ D
	3 ☐ A ☐ B ☒ C ☐ D
	4 ☐ A ☐ B ☒ C ☐ D

Candidate's Signature

5. If you want to change your answer, ERASE the first answer completely with a rubber, before blacking out a new circle.
6. DO NOT write anything in the answer grid. The computer only records what is in the circles.
7. The marks obtained on the 50 MCQs will be equated to the total marks of 75 for the theory examination results.
8. You may use a simple calculator if you wish.

1. On converting $\frac{1}{2}$ of 2% into fraction, we get
 - A. $\frac{1}{25}$
 - B. $\frac{1}{50}$
 - C. $\frac{1}{100}$
 - D. $\frac{1}{200}$
2. Which of the following fractions is equivalent to 30%?
 - A. $\frac{3}{10}$
 - B. $\frac{3}{100}$
 - C. $\frac{7}{10}$
 - D. $\frac{7}{100}$
3. A bag contains 60 balls of red and white colours. If the ratio of red balls to white balls is 3:1, then the number of white balls in the bag will be
 - A. 15
 - B. 30
 - C. 40
 - D. 45
4. A jar contains 250 g of cereal. If Rahat eats 30% of the cereal, then the remaining cereal in the jar will be
 - A. 75 g.
 - B. 150 g.
 - C. 220 g.
 - D. 175 g.
5. The ratio of the ages of Nazia and Shazia is 2:3. If Nazia is 10 years old, then the age of Shazia will be
 - A. 12 years.
 - B. 13 years.
 - C. 15 years.
 - D. 18 years.

6. Sara bought a dress online for Rs 2,900 and was charged an additional 5% for delivery. The total cost of the dress was
- A. Rs 3,040
 - B. Rs 3,045
 - C. Rs 3,140
 - D. Rs 3,145
7. If m varies inversely to the square root of n^2 , then it can be expressed as
- A. $m \propto \sqrt{n}$.
 - B. $m \propto \frac{1}{n}$.
 - C. $m \propto \frac{1}{n^2}$.
 - D. $m \propto \frac{1}{\sqrt{n}}$.
8. The ratio of 60 to 6 is equal to
- A. 2:5
 - B. 5:2
 - C. 1:10
 - D. 10:1
9. The annual earnings of a man from agricultural farm X and Y are Rs 425,000 and Rs 275,000 respectively. The amount of *Ushr* for the year, in rupees, is
- (Note: Rate of *Ushr* is 10% of the earning.)
- A. 15,000
 - B. 30,000
 - C. 70,000
 - D. 140,000
10. Ms Saheen left a property of Rs 785,000. If she had only two sons and a daughter among her legal heirs, the total inheritance of two sons, in rupees, will be
- (Note: The share of son is two times that of the daughter.)
- A. 157,000
 - B. 314,000
 - C. 523,333
 - D. 628,000

11. Last year, Zahid paid *zakat* of Rs 13,500 on his annual savings. His annual savings for the last year was

(Note: Rate of *zakat* is 2.5%.)

- A. Rs 54,000
- B. Rs 54,500
- C. Rs 540,000
- D. Rs 545,000

12. A man leaves behind a land worth Rs 300,000. If he has two sons and a daughter as his legal heirs, the inheritance of daughter is

(Note: The share of son is two times that of daughter.)

- A. Rs 60,000
- B. Rs 80,000
- C. Rs 100,000
- D. Rs 120,000

13. If the cost price of an item is Rs 955 and it is sold at a price of Rs 845, then the loss is

- A. 10%
- B. 11.5%
- C. 13.01%
- D. 15%

14. Miraj bought twelve dozens of bananas for Rs 1,284. If one dozen of bananas are rotten, then the percentage loss he suffered will be

- A. 6.33%
- B. 8.33%
- C. 9.09%
- D. 11.09%

15. In a sale, a superstore reduced the marked price of garments by 15%. If the marked price of a shirt was Rs 860, then its discounted price will be Rs

- A. 129
- B. 189
- C. 671
- D. 731

16. The marked price of a sofa set is Rs 35,000. If the discount offered is 10% and sales tax of 5% is levied on the discounted price, then the total cost of the sofa set will be Rs

- A. 33,075
- B. 33,750
- C. 29,925
- D. 29,750

17. In a business, Sara and Maria invested Rs 800,000 and Rs 1,200,000 respectively. At the end of year, they got a profit of Rs 500,000. The share of Maria in the profit is Rs
- 200,000
 - 250,000
 - 275,000
 - 300,000
18. In a business, Adnan invested two times the amount invested by Salman. If they earned a certain profit and Salman's share is Rs 275,000, then their total profit will be Rs
- 412,500
 - 550,000
 - 650,000
 - 825,000
19. If $y^{-m} \div y^{2m}$ is expressed in the form y^b , then the value of b is equal to
- m .
 - $-m$.
 - $3m$.
 - $-3m$.
20. In radical form, $n^{\frac{5}{2}}$ is expressed as
- $\sqrt{n^5}$
 - $\sqrt[5]{n^2}$
 - $(\sqrt{n^5})^2$
 - $(\sqrt{n^2})^5$
21. The number 35,000 can also be expressed as 3.5×10^m . The value of m is equal to
- 4
 - 3
 - 3
 - 4
22. On evaluating, the value of $\log_m \left(\frac{\sqrt{m}}{m} \right)$ is equal to
- $-\frac{1}{2}$
 - $\frac{1}{2}$
 - 0
 - 1

23. The expression $(\sqrt{5})^x = 5$, into the logarithmic form can be written as

- A. $\log_{\sqrt{5}} x = 5$
- B. $\log_x \sqrt{5} = 5$
- C. $\log_x 5 = \sqrt{5}$
- D. $\log_{\sqrt{5}} 5 = x$

24. If $\log_2 \sqrt{8} = x$, then the value of x will be

- A. $-\frac{3}{2}$
- B. $-\frac{2}{3}$
- C. $\frac{2}{3}$
- D. $\frac{3}{2}$

25. $\frac{a}{a^2 \times a^{-2}}$ is equal to

- A. a
- B. $\frac{1}{a}$
- C. 0
- D. 1

26. $(a^{-1} \times b)^{-1}$ is equal to

- A. $-\frac{a}{b}$
- B. $\frac{a}{b}$
- C. $\frac{b}{a}$
- D. $\frac{a^2}{b}$

27. 0.00717 is equal to

- A. 71.710×10^{-3}
- B. 7.17×10^{-2}
- C. 71.710×10^{-2}
- D. 7.17×10^{-3}

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28. The exponential form of $-\sqrt[3]{a^2} \times \sqrt{a}$ is equal to

- A. $a^{-\frac{7}{6}}$
- B. $a^{-\frac{3}{5}}$
- C. $-a^{\frac{7}{6}}$
- D. $-a^{\frac{3}{5}}$

29. On simplification $\frac{x^0 \times y}{xy}$ is equal to

- A. 0
- B. $\frac{1}{x}$
- C. $\frac{1}{xy}$
- D. 1

30. If $2(a+b)=1$ and $3(a-b)=2$, then the value of $6(a^2-b^2)$ is equal to

- A. 1
- B. 2
- C. 6
- D. 12

31. The value of $\sqrt{9} - \sqrt{2} - 1$ is equal to

- A. $\sqrt{7} - 1$
- B. $\sqrt{7} + 1$
- C. $2 + \sqrt{2}$
- D. $2 - \sqrt{2}$

32. An example of polynomial expression is

- A. $x^2 - \sqrt{2}x - \frac{3}{2}$
- B. $x^2 - \sqrt{2x} - \frac{3}{2}$
- C. $x^{-2} - \sqrt{2x} + 2$
- D. $x^2 - \sqrt{2x} + 2$

33. On simplification of $\left(1 - \frac{1}{x}\right) \times \frac{x}{x-1}$, we get
- A. 0
 - B. 1
 - C. $\frac{(x-1)^2}{x^2}$
 - D. $\frac{x-1}{x}$
34. If the values of $a + b = 7$ and $4ab = 40$, then the value of $(a - b)^2$ will be
- (Note: $(a+b)^2 - (a-b)^2 = 4ab$)**
- A. 3
 - B. 9
 - C. 81
 - D. 89
35. On complete factorisation of $2(m^2 - 1)$, we get
- A. $2(m-1)^2$
 - B. $2(m - \sqrt{2})^2$
 - C. $2(m+1)(m-1)$
 - D. $2(m + \sqrt{2})(m - \sqrt{2})$
36. The expression $p^2 + 9 - 10p + 16$ can also be written as
- A. $(p+5)^2$
 - B. $(p-5)^2$
 - C. $(p-3)^2 + 4^2$
 - D. $(p+3)^2 + 4^2$
37. On complete factorisation of $ab - b - a^2 + a$, we get
- A. $(a-b)(a-1)$
 - B. $(b-a)(1-a)$
 - C. $(b-a)(a-1)$
 - D. $(b-a)(a+1)$

38. On complete factorisation of $2\left(a^2 - \frac{1}{4}\right)$, we get

- A. $\left(a - \frac{1}{2}\right)\left(a + \frac{1}{2}\right)$.
- B. $\left(a - \frac{1}{2}\right)\left(a - \frac{1}{2}\right)$.
- C. $2\left(a - \frac{1}{2}\right)\left(a + \frac{1}{2}\right)$.
- D. $2\left(a - \frac{1}{2}\right)\left(a - \frac{1}{2}\right)$.

39. If $ax^2 - 2x + 3$ is divided by $x + 1$ the remainder is 2, then the value of a will be

- A. -3
- B. -1
- C. 1
- D. 3

40. On complete factorisation of $-9ad^2 + 3ad - 3a$, we get

- A. $-3a(3d^2 - d)$.
- B. $-3a(3d^2 - d + 1)$.
- C. $3a(3d^2 - d + 1)$.
- D. $-3a(6d^2 - d + 1)$.

41. If $\begin{bmatrix} 2 & 3 \\ 3 & 2 \end{bmatrix} - 2X = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$, then the matrix X will be

- A. $\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$.
- B. $\begin{bmatrix} 4 & 4 \\ 4 & 4 \end{bmatrix}$.
- C. $\begin{bmatrix} -2 & -2 \\ -2 & -2 \end{bmatrix}$.
- D. $\begin{bmatrix} -1 & -1 \\ -1 & -1 \end{bmatrix}$.

42. If $X = \begin{bmatrix} -a & 1 \\ 3 & b \end{bmatrix}$ is a non-singular matrix and $|X| = 2ab$, then the value of ab will be

- A. -3
- B. -1
- C. 1
- D. 3

43. Consider the matrices $\begin{bmatrix} a & 1 \\ 3 & 7 \end{bmatrix}$ and $\begin{bmatrix} 11 & 0 \\ 3 & 1 \end{bmatrix}$.

If the determinants of the given matrices are equal, then the value of a will be

- A. -1
- B. -2
- C. 1
- D. 2

44. For the matrices $X = \begin{bmatrix} 3 & 7 \end{bmatrix}$, $Y = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ and $Z = \begin{bmatrix} 1 & 0 \\ 3 & 7 \end{bmatrix}$, which of the following matrix product exist(s)?

- I. $Y \times X$
 - II. $Y \times Y$
 - III. $Z \times Z$
- A. I only
 - B. II only
 - C. I and III
 - D. II and III

45. On simplification of the matrix expression $\begin{bmatrix} 3 & 0 & -1 \end{bmatrix} - 2\begin{bmatrix} 3 & 0 & -1 \end{bmatrix}$, we get

- A. $\begin{bmatrix} 6 \end{bmatrix}$.
- B. $\begin{bmatrix} -6 \end{bmatrix}$.
- C. $\begin{bmatrix} -3 & 0 & 1 \end{bmatrix}$.
- D. $\begin{bmatrix} 3 & 0 & -1 \end{bmatrix}$.

46. The matrix $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ can be identified as

- I. Diagonal matrix
- II. Multiplicative identity matrix
- III. Scalar matrix
- IV. Square matrix

- A. II only.
- B. IV only.
- C. I and II.
- D. III and IV.

47. The matrix $\begin{bmatrix} a-b-c \\ b-c-d \\ c-d-e \end{bmatrix}$ can be identified as

- I. Rectangular matrix
- II. Column matrix
- III. Row matrix
- IV. Null matrix

- A. III only.
- B. IV only.
- C. I and II.
- D. I and IV.

48. The product $\begin{bmatrix} 1 & 3 \end{bmatrix} \times \begin{bmatrix} 1 & 2 \\ 4 & 3 \end{bmatrix}$ is equal to

- A. $\begin{bmatrix} 13 & 11 \end{bmatrix}$.
- B. $\begin{bmatrix} 13 \\ 11 \end{bmatrix}$.
- C. $\begin{bmatrix} 1 & 6 \\ 4 & 9 \end{bmatrix}$.
- D. $\begin{bmatrix} 1 & 2 \\ 12 & 9 \end{bmatrix}$.

49. It is given that $S = \begin{bmatrix} -1 \\ 1 \end{bmatrix}$ and $S \times N = \begin{bmatrix} 2 \\ -2 \end{bmatrix}$.

The order of matrix N

- A. is 1×1
- B. is 2×1
- C. is 1×2
- D. cannot be determined

50. Using Crammer's rule, the value of x , for $2x - 3y = 3$ and $3x + 2y = 11$ is expressed as

A. $x = \frac{\begin{vmatrix} 3 & -3 \\ 11 & 2 \end{vmatrix}}{\begin{vmatrix} 2 & -3 \\ 3 & 2 \end{vmatrix}}.$

B. $x = \frac{\begin{vmatrix} -3 & -3 \\ 2 & 11 \end{vmatrix}}{\begin{vmatrix} 2 & -3 \\ 3 & 2 \end{vmatrix}}.$

C. $x = \frac{\begin{vmatrix} 2 & -3 \\ 3 & 2 \end{vmatrix}}{\begin{vmatrix} 3 & -3 \\ 11 & 2 \end{vmatrix}}.$

D. $x = \frac{\begin{vmatrix} 3 & -3 \\ 11 & 2 \end{vmatrix}}{\begin{vmatrix} 3 & -3 \\ 2 & 2 \end{vmatrix}}.$

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