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CLASS 10 MATH TEST PAPER 15

Class 10 - Mathematics

Maximum Marks: 80

Time Allowed: 3 hours

General Instructions:

This Question Paper consists for 6 chapters (Real Numbers, Polynomials, Pair Of Linear Equations In Two

Variables, Pair Of Linear Equations In Two Variables, Arithmetic Progressions, Triangles)

Section A			
If 2800 = $2^{x} \times 5^{y} \times 7$, then the value of (x + y) is:		[1]	
a) 5	b) 8		
c) 4	d) 6		
If n is a natural number, then 8 ⁿ cannot end with dig	it v	[1]	
a) 4	b) 6		
c) 2	d) 0		
The zeros of the polynomial $x^2 - 2x - 3$ are		[1]	
a) -3, 1	b) 3,-1		
c) 3, 1	d) -3, -1		
If α and β are the zeroes of the polynomial $3x^2 + 11$	x - 4, then the value of $\frac{1}{\alpha} + \frac{1}{\beta}$ is	[1]	
a) $\frac{13}{4}$	b) $\frac{12}{4}$		
c) $\frac{11}{4}$	d) $\frac{15}{4}$		
A quadratic polynomial, one of whose zeroes is 2 +	$\sqrt{5}$ and the sum of whose zeroes is 4, is:	[1]	
a) $x^2 + 4x + 1$	b) $x^2 - 4x + 1$		
c) $x^2 - 4x - 1$	d) $x^2 + 4x - 1$		
If a pair of linear equations in two variables is consis	stent, then the lines represented by two equations are	[1]	
a) parallel	b) always coincident		
c) always intersecting	d) intersecting or coincident		
If $2^{x+y} = 2^{x-y} = \sqrt{8}$ then the value of y is		[1]	
a) 1	b) 0		
c) $\frac{3}{2}$	d) $\frac{1}{2}$		
The graphs of the equations $6x - 2y + 9 = 0$ and $3x - 2y + 9 = 0$	y + 12 = 0 are two lines which are	[1]	
a) perpendicular to each other	b) parallel		
c) coincident	d) intersecting exactly at one point		
	Solution of the polynomial $x^2 - 2x - 3$ are a) 5 c) 4 If n is a natural number, then 8^n cannot end with dig a) 4 c) 2 The zeros of the polynomial $x^2 - 2x - 3$ are a) $-3, 1$ c) $3, 1$ If α and β are the zeroes of the polynomial $3x^2 + 11$ a) $\frac{13}{4}$ c) $\frac{11}{4}$ A quadratic polynomial, one of whose zeroes is $2 + 11$ a) $x^2 + 4x + 1$ c) $x^2 - 4x - 1$ If a pair of linear equations in two variables is consisting a) parallel c) always intersecting If $2^{x+y} = 2^{x-y} = \sqrt{8}$ then the value of y is a) 1 c) $\frac{3}{2}$ The graphs of the equations $6x - 2y + 9 = 0$ and $3x - 3x - 3$ a) perpendicular to each other c) coincident	Section A If 2800 = 2 ³ × 5 ³ × 7, then the value of (x + y) is: a) 5 b) 8 a) 5 b) 8 c) 4 d) 6 If is a natural number, then 8 ⁿ cannot end with dig: a) 4 b) 6 c) 2 d) 0 The zeros of the polynomial x ² - 2x - 3 are a) -3, 1 b) 3, -1 c) 3, 1 d) -3, -1 If α and β are the zeroes of the polynomial $3x^2 + 11x - 4$, then the value of $\frac{1}{\alpha} + \frac{1}{\beta}$ is a) $\frac{31}{4}$ b) $\frac{12}{4}$ c) $\frac{1}{4}$ b) $\frac{12}{4}$ c) $\frac{1}{4}$ d) $\frac{15}{4}$ A quadratic polynomial, one of whose zeroes is $2 + \sqrt{5}$ and the sum of whose zeroes is 4 , is: a) $\frac{2}{3}$ b) $x^2 - 4x + 1$ c) $x^2 - 4x + 1$ b) $x^2 - 4x + 1$ d) $2x^2 - 4x - 1$ d) aives coincident q) parallel b) always coincident c) always intersecting d) intersecting or coincident a) 1 b) 0 c) $\frac{3}{2}$ d) $\frac{1}{2}$ TH particular to equations $6x - 2y + 9 = 0$ and $3x - 1$ b) 0 $\frac{1}{2}$ a) 1 b) 2	

9.	Which of the following equations has 2 as a root?		[1]
	a) $2x^2 - 7x + 6 = 0$	b) $3x^2 - 6x - 2 = 0$	
	c) $x^2 + 3x - 12 = 0$	d) $x^2 - 4x + 5 = 0$	
10.	If $y = 1$ is one of the solutions of the quadratic equation $py^2 + py + 3 = 0$, then the value of p is: [1		
	a) -3	b) 2	
	c) $-\frac{3}{2}$	d) -2	
11.	If the quadratic equation $9x^2 + bx + \frac{1}{4} = 0$ has equal	roots, then the value of b is:	[1]
	a) 3 only	b) 0	
	c) -3 only	d) ± 3	
12.	12. If the sum of n terms of an A.P. be $3n^2 + n$ and its common difference is 6 then its first term is [1]		
	a) 2	b) 1	
	c) 3	d) 4	
13.	The 8 th term of an A.P. is 17 and its 14 th term is 29. T	The common difference of this A.P. is:	[1]
	a) 2	b) 5	
	c) -2	d) 3	
14.	The seventh term of an A.P. whose first term is 28 an	d common difference -4, is	[1]
	a) 56	b) 0	
	c) 52	d) 4	
15.	If k, $2k - 1$ and $2k + 1$ are three consecutive terms of an AP, the value of k is [1]		
	a) 3	b) 6	
	c) -3	d) -2	
16.	D and E are respectively the points on the sides AB a	nd AC of a triangle ABC such that $AD = 2 \text{ cm}$, $BD = 3 \text{ cm}$,	[1]
	BC = 7.5 cm and DE \parallel BC. Then, length of DE (in cm) is		
	a) 6	b) 5	
	c) 2.5	d) 3	
17.	\triangle PQR ~ \triangle XYZ and the perimeters of \triangle PQR and <i>i</i> then, YZ is equal to	riangle XYZ are 30 cm and 18 cm respectively. If QR = 9 cm,	[1]
	a) 4.5 cm	b) 5.4 cm	
	a) 4.5 cm	d) 9.5 cm	
18.	If the diagonals of a quadrilateral divide each other p	roportionally then it is a	[1]
	a) square		
	c) trapezium	d) parallelogram	
19.	Assertion (A): $\sqrt{2}(5 - \sqrt{2})$ is an irrational number.	a) parameropram	[1]
-	Reason (R): Product of two irrational numbers is alw	vays irrational.	

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- a) Both A and R are true and R is the correct explanation of A.
- b) Both A and R are true but R is not the correct explanation of A.
- c) A is true but R is false. d) A is false but R is true.

Assertion (A): Zeroes of a polynomial $p(x) = x^2 - 2x - 3$ are -1 and 3. 20.

Reason (R): The graph of polynomial $p(x) = x^2 - 2x - 3$ intersects x-axis at (-1, 0) and (3, 0).

a) Both A and R are true and R is the correct	b) Both A and R are true but R is not the
explanation of A.	correct explanation of A.
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d) A is false but R is true.

Section B

Prove that 5 + 2 $\sqrt{3}$ is an irrational number, given that $\sqrt{3}$ is an irrational number. [2] 21. OR

Find the HCF of 96 and 404 by prime factorisation method. Hence, find their LCM.

- Zeroes of the quadratic polynomial $x^2 3x + 2$ are α and β . Construct a quadratic polynomial whose zeroes are 2 [2] 22. α + 1 and 2 β + 1.
- 23. Find the values of **a** and **b** for which the system of linear equations 3x + 4y = 12, (a + b)x + 2(a - b)y = 24 has [2] infinite number of solutions.
- [2] Find the nature of the roots of the quadratic equation $x^2 - 5x + 9 = 0$. 24.
- 25. In the given figure, CD is the perpendicular bisector of AB. EF is perpendicular to CD. AE intersects CD at G. [2] Prove that $\frac{CF}{CD} = \frac{FG}{DG}$



Section C

- 26. There are 156, 208 and 260 students in groups A, B and C respectively. Buses are to be hired to take them for a [3] field trip. Find the minimum number of buses to be hired, if the same number studets should be accommodated in each bus.
- Find the zeroes of the given quadratic polynomials and verify the relationship between the zeroes and the 27. [3] coefficients. $6x^2 - 3 - 7x$

OR

If one zero of the polynomial $2x^2 + 3x + \lambda$ is $\frac{1}{2}$, find the value of λ and other zero.

- 28. Jaya scored 40 marks in a test getting 3 marks for each correct answer and losing 1 mark for each incorrect [3] answer. Had 4 marks being awarded for each correct answer and 2 marks were deducted for each incorrect answer then Jaya again would have scored 40 marks. How many questions were there in the Test?
- 29. A speed of a boat in still water is 11 km/hour. It can go 12 km upstream and return downstream to the original [3] point in 2 hours 45 minutes. Find the speed of the stream.

OR

A bookseller buys a number of books for ₹ 1760. If he had bought 4 more books for the same amount, each book would have cost ₹ 22 less. How many books did he buy?

The 26th, 11th and last term of an A.P. are 0, 3 and $-\frac{1}{5}$, respectively. Find the common difference and the [3] 30.

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[1]

number of terms.

31. Let X be any point on the side BC of a triangle ABC. If XM, XN are drawn parallel to BA and CA meeting CA, [3] BA in M, N respectively; MN meets BC produced in T, prove that $TX^2 = TB \times TC$.



Section D

32. Solve the system of equations 2x - 5y + 4 = 0, 2x + y - 8 = 0 graphically and find the vertices and area of the [5] triangle formed by these lines and the y-axis.

OR

It can take 12 hours to fill a swimming pool using two pipes. If the pipe of larger diameter is used for four hours and the pipe of smaller diameter for 9 hours, only half of the pool can be filled. How long would it take for each pipe to fill the pool separately?

- 33. A train travels a distance of 90 km at a constant speed. Had the speed been 15 km/h more, it would have taken [5]30 minutes less for the journey. Find the original speed of the train.
- 34. In an A.P. of 40 terms, the sum of first 9 terms is 153 and the sum of last 6 terms is 687. Determine the first term [5] and common difference of A.P. Also, find the sum of all the terms of the A.P.
- 35. If a line is drawn parallel to one side of a triangle to intersect the other two sides at distinct points, then prove [5] that the other two sides are divided in the same ratio.

OR

In the given figure PA, QB and RC are each perpendicular to AC. If AP = x, BQ = y and CR = z, then prove that $\frac{1}{x} + \frac{1}{z} = \frac{1}{y}$



Section E

36. **Read the following text carefully and answer the questions that follow:**

[4]

Khushi wants to organize her birthday party. Being health conscious, she decided to serve only fruits in her

birthday party. She bought 36 apples and 60 bananas and decided to distribute fruits equally among all.



- i. How many guests Khushi can invite at the most? (1)
- ii. How many apples and bananas will each guest get? (1)
- iii. If Khushi decides to add 42 mangoes, how many guests Khushi can invite at the most? (2)

OR

If the cost of 1 dozen of bananas is \gtrless 60, the cost of 1 apple is \gtrless 15 and cost of 1 mango is \gtrless 20, find the total amount spent on 60 bananas, 36 apples and 42 mangoes. (2)

37. Jaspal Singh is an auto driver. His autorickshaw was too old and he had to spend a lot of money on repair and [4] maintenance every now and then. One day he got to know about the EV scheme of the Government of India where he can not only get a good exchange bonus but also avail heavy discounts on the purchase of an electric vehicle. So, he took a loan of Rs.1,18,000 from a reputed bank and purchased a new autorickshaw.



Jaspal Singh repays his total loan of 118000 rupees by paying every month starting with the first instalment of 1000 rupees.

- i. If he increases the installment by 100 rupees every month, then what amount will be paid by him in the 4th installment? (1)
- ii. If he increases the installment by 100 rupees every month, then what amount will be paid by him in the 30th installment? (1)
- iii. What is the total amount paid till 30th installment?

OR

What amount of loan does he still have to pay after 30th installment? (2)

38. **Read the following text carefully and answer the questions that follow:**

In the figure given below, a folding table is shown:



The legs of the table are represented by line segments AB and CD intersecting at O. Join AC and BD.

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[4]

Considering table top is parallel to the ground, and OB = x, OD = x + 3, OC = 3x + 19 and OA = 3x + 4, answer the following questions:

- i. Prove that $\triangle OAC$ is similar to $\triangle OBD$.
- ii. Prove that $\frac{OA}{AC} = \frac{OB}{BD}$
- iii. a. Observe the figure and find the value of x. Hence, find the length of OC.

OR

b. Observe the figure and find $\frac{BD}{AC}$.

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