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# VIBRANT ACADEMY ANNOUNCES

## VAJRA-111

मात्र 1

रूपये में

हॉस्टल

मात्र 1

रूपये में

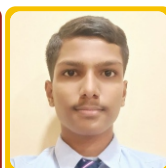
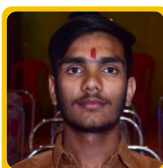
ऑफलाइन  
IIT कोचिंग  
@ कोटा

मात्र 1

रूपये में

मैस

Meet Few of  
Our  
**VAJRA-111**  
Qualifiers



नाम	विकाश कुमार	हिमांशु	सौरभ कुमार	प्रथमेश सालुंके
पिता का नाम	लड्डू पंडित	दिवाकर कुमार	भोला शंकर	विजय कुमार सालुंके
पिता का व्यवसाय	किसान	कॉन्स्टेबल	चाउमीन ठेला	शिक्षक
पता	खगरिया, बिहार	लखीसराय, बिहार	बिहार	लातूर, महाराष्ट्र
ऑफलाइन कोचिंग शुल्क	₹1	₹1	₹1	₹1
हॉस्टल शुल्क	₹1	₹1	₹1	₹1
मैस शुल्क	₹1	₹1	₹1	₹1

शिक्षा सबसे शक्तिशाली हथियार है जिसका उपयोग आप दुनिया को बदलने के लिए कर सकते हैं - नेल्सन मंडेला

गुणवत्तापूर्ण शिक्षा तक पहुंच विद्यार्थी का एक मौलिक अधिकार है और यह सुनिश्चित करना महत्वपूर्ण है कि आर्थिक रूप से कमजोर छात्रों को अपनी पढ़ाई में सफल होने के लिए आवश्यक समर्थन मिले। इस भाव को ध्यान में रखकर वाइब्रेंट अकादमी ने वज-111 प्रोग्राम की शुरुआत की है, अब सौरभ, हिमांशु, बिकाश और प्रथमेश श्री कोटा में पढ़ेंगे और IIT जैसे उच्च इंजीनियरिंग कॉलेज में प्रवेश पायेंगे।

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**SESSION- 2022-23**  
**CLASS - X**  
**SUBJECT- MATHEMATICS (STANDARD)**

**Time: -3 Hrs.**

**M.M: -80**

**General Instructions: All questions are compulsory.**

1. This Question Paper has 5 Sections A-E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2marks questions of Section E
8. Draw neat figures wherever required. Take  $\pi = 22/7$  wherever required if not stated.

**SECTION – A**

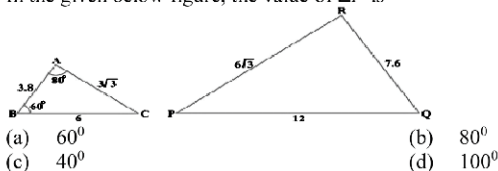
1. The HCF of two numbers is 23 and their LCM is 1449. If one of the numbers is 161, then the other number is  
(a) 23 (b) 207  
(c) 1449 (d) none of these
2. A quadratic polynomial whose sum and product of zeroes are  $-3$  and  $2$  is  
(a)  $x^2 - 3x + 2$  (b)  $x^2 + 3x + 2$   
(c)  $x^2 + 2x - 3$  (d)  $x^2 + 2x + 3$ .
3. The difference between two numbers is 14 and the difference between their squares is 448, then the numbers are  
(a) 25 and 9 (b) 22 and 9  
(c) 23 and 9 (d) none of these
4. Values of  $k$  for which the quadratic equation  $2x^2 - kx + k = 0$  has equal roots is  
(a) 0 only (b) 4  
(c) 8 only (d) 0, 8
5. If 7 times the 7<sup>th</sup> term of an AP is equal to 11 times its 11th term, then its 18<sup>th</sup> term will be  
(a) 7 (b) 11  
(c) 18 (d) 0
6. If in triangles ABC and DEF,  $\frac{AB}{DE} = \frac{BC}{FD}$ , then they will be similar, when  
(a)  $\angle B = \angle E$  (b)  $\angle A = \angle D$   
(c)  $\angle B = \angle D$  (d)  $\angle A = \angle F$
7. AOBC is a rectangle whose three vertices are vertices A (0, 3), O (0, 0) and B (5, 0). The length of its diagonal is  
(a) 5 (b) 3  
(c) 34 (d) 4
8. Evaluate:  $-\frac{2 \tan 30^\circ}{1 + \tan^2 30^\circ}$   
(a)  $\sin 60^\circ$  (b)  $\cos 60^\circ$   
(c)  $\tan 60^\circ$  (d)  $\sin 30^\circ$

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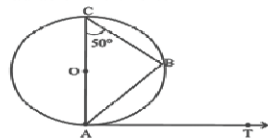


9. The angle of elevation of the top of a tower from a point on the ground, which is 30 m away from the foot of the tower, is  $30^\circ$ . Find the height of the tower.
- (a) 30m (b)  $20\sqrt{3}$   
(c)  $10\sqrt{3}$  (d) 20m
10. In Figure, if O is the centre of a circle, PQ is a chord and the tangent PR at P makes an angle of  $50^\circ$  with PQ, then  $\angle POQ$  is equal to
- (a)  $100^\circ$  (b)  $80^\circ$   
(c)  $90^\circ$  (d)  $75^\circ$
11. The diameter of a circle whose area is equal to the sum of the areas of the two circles of radii 24 cm and 7 cm is
- (a) 31 cm (b) 25 cm  
(c) 62 cm (d) 50 cm
12. The probability of getting a bad egg in a lot of 400 is 0.035. The number of bad eggs in the lot is
- (a) 7 (b) 14  
(c) 21 (d) 28
13. What is probability of getting a multiple of 7 between 1 to 100 including both.
- (a)  $\frac{7}{50}$  (b)  $\frac{17}{21}$   
(c)  $\frac{17}{20}$  (d)  $\frac{19}{20}$
14. TP and TQ are the two tangents to a circle with center O so that angle  $\angle POQ = 130^\circ$ . Find  $\angle PTQ$ .
- (a)  $50^\circ$  (b)  $70^\circ$   
(c)  $80^\circ$  (d) none of these

15. In the given below figure, the value of  $\angle P$  is



16. Find a relation between  $x$  and  $y$  such that the point  $(x, y)$  is equidistant from the point  $(3, 6)$  and  $(-3, 4)$ .
- (a)  $3x + 3y - 5 = 0$  (b)  $3x - y - 5 = 0$   
(c)  $3x - y + 5 = 0$  (d)  $3x + y - 5 = 0$
17. Tick the correct answer in the following and justify your choice: If the perimeter and the area of a circle are numerically equal, then the radius of the circle is
- (a) 2 units (b)  $\pi$  units  
(c) 4 units (d) 7 units
18. The length of a tangent from a point A at distance 5 cm from the centre of the circle is 4 cm. Find the radius of the circle.



- (a) 2cm (b) 3cm  
(c) 4cm (d) 5 cm

19. **Assertion:** Sum of natural number from 1 to 100 is 5050  
**Reason:** Sum of  $n$  natural number is  $n(n+1)/2$   
 (a) Both Assertion and Reason are correct and Reason is the correct explanation for Assertion  
 (b) Both Assertion and Reason are correct and Reason is not the correct explanation for Assertion.  
 (c) assertion is true but the reason is false.  
 (d) both assertion and reason are false.
20. **Assertion:**  $3 \times 5 \times 7 + 7$  is a composite number.  
**Reason:** A composite number has factors one, itself and any other natural number.  
 (a) Both assertion (A) and reason (R) are true and reason(R) is the correct explanation of assertion (A).  
 (b) Both assertion (A) and reason (R) are true but reason(R) is not the correct explanation of assertion (A).  
 (c) Assertion (A) is true but reason (R) is false.  
 (d) Assertion (A) is false but reason (R) is true.

### SECTION - B

21. If  $\alpha$  and  $\beta$  are the zeroes of the quadratic polynomial  $f(x) = 6x^2 + x - 2$ , then find the value of  $\alpha^2\beta + \beta^2\alpha$ .
22. Given that  $\sqrt{5}$  is irrational prove that  $2\sqrt{5} - 3$  is an irrational.
23. The first and the last terms of an AP are 17 and 350 respectively. If the common difference is 9, how many terms are there and what is their sum?

OR

Determine the AP whose third term is 16 and the 7th term exceeds the 5th term by 12.

24. Find  $x$ :  $x + \frac{1}{x} = 3, x \neq 0$

OR

Rohan's mother is 26 years older than him. The product of their ages (in years) 3 years from now will be 360. We would like to find Rohan's present age.

25. Given  $15 \cot A = 8$ , find  $\sin A$  and  $\sec A$ .

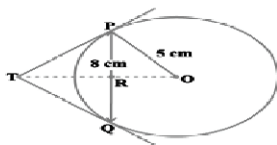
### SECTION -C

26. Find the zeroes of polynomial  $p(x) = 6x^2 - 3 - 7x$  and verify the relationship between the zeroes and the Coefficients.
28. Determine the ratio in which the line  $2x + y - 4 = 0$  divides the line segment joining the points  $A(2, -2)$  and  $B(3, 7)$ .
27. If the ratio of the sum of the first  $n$  terms of two A.Ps is  $(7n+1) : (4n+27)$ , then find the ratio of their 9<sup>th</sup> terms.
29. Yash scored 40 marks in a test, getting 3 marks for each right answer and losing 1 mark for each wrong answer. Had 4 marks been awarded for each correct answer and 2 marks been deducted for each incorrect answer, then Yash would have scored 50 marks. How many questions were there in the test?

OR

The area of a rectangle gets reduced by 9 square units, if its length is reduced by 5 units and breadth is increased by 3 units. If we increase the length by 3 units and the breadth by 2 units, the area increases by 67 square units. Find the dimensions of the rectangle.

31. PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q intersect at a point T (see Figure). Find the length TP.



- Q30. A man standing on the deck of the ship which is 10 m above the sea level, observes the angle of elevation of the top of the cloud as  $30^\circ$  and angle of depression of its reflection in the sea was found to be  $60^\circ$ . Find the height of the cloud and also the distance of the cloud from the ship.

OR

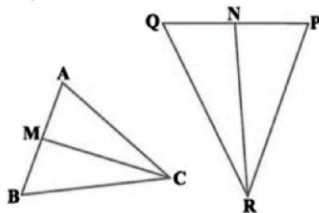
Two poles of equal heights are standing opposite each other on either side of the road, which is 80 m wide. From a point between them on the road, the angles of elevation of the top of the poles are  $60^\circ$  and  $30^\circ$ , respectively. Find the height of the poles and the distances of the point from the poles

### SECTION - D

32. An express train takes 1 hour less than a passenger train to travel 132 km between Mysore and Bangalore (without taking into consideration the time they stop at intermediate stations). If the average speed of the express train is 11 km/h more than that of the passenger train, find the average speed of the two trains.
33. Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then the other two sides are divided in the same ratio.

OR

In Figure, CM and RN are respectively the medians of  $\triangle ABC$  and  $\triangle PQR$ . If  $\triangle ABC \sim \triangle PQR$ , prove that:



(i)  $\triangle AMC \sim \triangle PNR$

(ii)  $\frac{CM}{RN} = \frac{AB}{PQ}$

(iii)  $\triangle CMB \sim \triangle RNQ$

34. A chord of a circle of radius 15 cm subtends an angle of  $60^\circ$  at the centre. Find the areas of the corresponding minor and major segments of the circle. (Use  $\pi = 3.14$  and  $\sqrt{3} = 1.73$ )
35. If  $\sec \theta = x + \frac{1}{4x}$ , then prove that  $\sec \theta + \tan \theta = 2x$  or  $\frac{1}{2x}$

OR

Prove that :  $\left( \frac{\sec A - 1}{\sec A + 1} \right) = \left( \frac{\sin A}{1 + \cos A} \right)^2 = (\cot A - \operatorname{cosec} A)^2$

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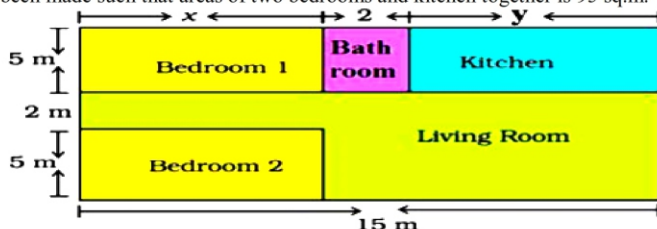
**GOOGOL(XII+) 19-04-2023**

**Test Dates: 19-03-2023 | 26-03-2023 | 09-04-2023 | 16-04-2023**



### SECTION - E

36. Amit is planning to buy a house and the layout is given below. The design and the measurement has been made such that areas of two bedrooms and kitchen together is 95 sq.m.



Based on the above information, answer the following questions:

- Form the pair of linear equations in two variables from this situation.
- Find the length of the outer boundary of the layout.
- Find the area of each bedroom and kitchen in the layout.

**OR**

Find the cost of laying tiles in kitchen at the rate of Rs. 50 per sq.m.

37. Rahul and Ravi planned to play Business ( board game) in which they were supposed to use two dice.



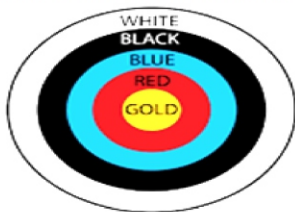
Ravi got first chance to roll the dice. What is the probability that he got the sum of the two numbers appearing on the top face of the dice is 8?

- Rahul got next chance. What is the probability that he got 5 will come up at least once?
- Now it was Ravi's turn. He rolled the dice. What is the probability that he got the sum of the two numbers appearing on the top face of the dice is greater than 8?

**OR**

Now it was Ravi's turn. He rolled the dice. What is the probability that he got the sum of the two numbers appearing on the top face of the dice is less than 8?

38. Figure depicts an archery target marked with its five scoring regions from the centre outwards as Gold, Red, Blue, Black and White. The diameter of the region representing Gold score is 21 cm and each of the other bands is 10.5 cm wide. Find the area of each of the five scoring regions.



- What is the radius of black color circle.
- What is the area of gold color region.
- What is the area of blue color region.

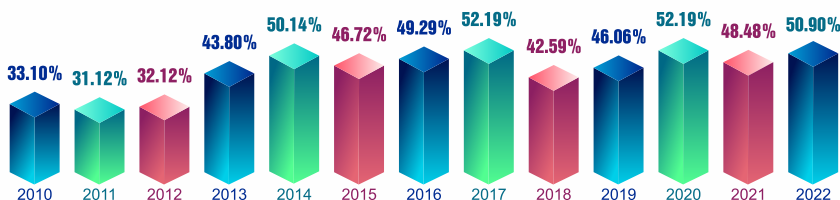
**OR**

What is the area of blue color region.

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