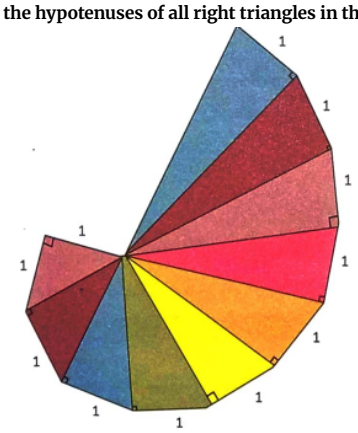
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Questions:

Long Answer Type Questions

1. If $x = \frac{\sqrt{a-1}+\sqrt{a+1}}{\sqrt{a-1}-\sqrt{a+1}}$ then show that $x^2 - 2ax + 1 = 0$
2. Express $0.4\overline{7}$ in the $\frac{p}{q}$ form, where p and q are integers and $q \neq 0$.
3. (A) Prove that $\sqrt{10}$ is irrational.
   (B) Explain the exact step where the proof method fails for $\sqrt{4}$ and $\sqrt{9}$. Why does it fail?
4. (A) State the hierarchy of number systems. Give one example at each stage which does not belong to the previous stage.
   (B) Show that between any two rational numbers, an irrational number exists.
   (C) Are irrational numbers always closed under addition? Give a counter-example.
5. Find the hypotenuses of all right triangles in the square root spiral.



For each, state whether rational or irrational. Also describe step-by-step how to construct and locate $\sqrt{5}$ on the number line.

Short Answer Type Questions

6. A merchant in the port city of Lothal receives 15 copper ingots for every 2 bags of spices. If he brings 12 bags ofspices to the market, how many copper ingots will he leave with?
7. Explain, using a real-world debt example, why subtracting a negative number is the same as adding a positive number.
8. Show that $\left(\frac{1}{2}+\frac{3}{4}\right)\frac{8}{3} = \left(\frac{1}{2}\times\frac{8}{3}\right)+\left(\frac{8}{4}\right)\left(\frac{8}{3}\right)$.Name and state the property verified.
9. Classify the following numbers as rational or irrational:
   (A) $\sqrt{23}$
   (B) $\sqrt{225}$
   (C) 0.3796
10. Given that $\sqrt{3}$ is irrational, prove that $5+2\sqrt{3}$ is irrational
11. A teacher explained her students of Class IX about irrational numbers, and how they are represented on a number line. During the class,she gave an irrational number to a student and asked her to represent this number $\sqrt{5}$ on a number line. Show how $\sqrt{5}$ can be represented on a number line
12. Describe step-by-step how to construct and locate $\sqrt{3}$ on the number line using compass and ruler.
13. Explain why rational numbers always have terminating or repeating decimals. Why can an irrational number never have either? Give one example of each.

Very Short Answer Type Questions

14. Simplify
    $2^{1/4} \times 8^{1/4}$
15. Simplify:
    $\left(\frac{27}{125}\right)^{-\frac{2}{3}}$
16. Rationalise the denominator of $\frac{4}{5\sqrt{5}}$.
17. Prove that $\sqrt{5}$ is irrational.
18. Classify as rational or irrational with reasons:
    (A) $\sqrt{(169)}$
    (B) $\sqrt{(75)}$
    (C) 0.12112111211112...
    (D) $3.\overline{205}$

Assertion and reason

19. Assertion (A): Natural numbers are closed under addition.
    Reason (R): The sum of any two natural numbers is always a natural number.
    Codes:
    (a) Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.
    (b) Both Assertion and Reason are correct but Reason is not the correct explanation of Assertion.
    (c) Assertion is correct but Reason is incorrect.
    (d) Assertion is incorrect but Reason is correct.

20. Assertion (A): (-3) x (-4) = +12.
Reason (R): The product of two debts (negatives) is a fortune (positive), per Brahmagupta
Codes:
(a) Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are correct but Reason is not the correct explanation of Assertion.
(c) Assertion is correct but Reason is incorrect.
(d) Assertion is incorrect but Reason is correct.

21. Assertion (A): $\frac{-3}{7}$ and $\frac{6}{(-14)}$ represent the Same rational number
Reason (R): Two rational numbers $\frac{a}{b}$ and $\frac{c}{d}$ are equal if ad = bc
Codes:
(a) Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are correct but Reason is not the correct explanation of Assertion.
(c) Assertion is correct but Reason is incorrect.
(d) Assertion is incorrect but Reason is correct.

22. Assertion (A): A non-terminating recurring decimal is an irrational number.
Reason (R): Every rational number has either a terminating or a non-terminating recurring decimal expansion.
Codes:
(a) Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are correct but Reason is not the correct explanation of Assertion.
(c) Assertion is correct but Reason is incorrect.
(d) Assertion is incorrect but Reason is correct.

23. Assertion (A): $\sqrt{36}$ is irrational.
Reason (R):$\sqrt{n}$ is irrational only when n is not a perfect square
Codes:
(a) Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are correct but Reason is not the correct explanation of Assertion.
(c) Assertion is correct but Reason is incorrect.
(d) Assertion is incorrect but Reason is correct.

2 Marks

24. Are the following statements true or false? Give reasons for your answers.
(i) Every whole number is a natural number.
(ii) Every integer is a rational number.
(iii) Every rational number is an integer.

25. Find the decimal expansions of 10/3, 7/8 and 1/7.

26. Divide $8\sqrt{15}$ by $2\sqrt{3}$

27. Show that 1.272727... = $1.\overline{27}$ can be expressed in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$

28. Simplify $\left(3^{\frac{1}{3}}\right)^4$

QB 365 TM Study Material
QUESTION BANK 365

Multiple Choice Question

29. Simplified value of $(25)^{\frac{1}{3}} \times (5)^{\frac{1}{3}}$ is:
(a) 25 (b) 3 (c) 1 (d) 5

30. The value of $2.\overline{9}$ in the form $\frac{a}{q}$ where p and q are integers and $q \neq 0$, is
(a) $\frac{2999}{1000}$ (b) $\frac{19}{10}$ (c) 3 (d) $\frac{26}{9}$

31. Value of $\frac{1}{\sqrt{18}-\sqrt{32}}$ is equal to:
(a) $\sqrt{2}$ (b) $-\sqrt{2}$ (c) $\frac{1}{\sqrt{2}}$ (d) $-\frac{1}{\sqrt{2}}$

32. The concept of one-to-one correspondence means:
(a) Adding two numbers (b) Matching each object to exactly one counting unit (c) Multiplying numbers together (d) Dividing a group equally

33. The early written symbol for zero in the Bakhshali Manuscript was a:
(a) Circle (O) (b) Cross (x) (c) Dot (bindu) (d) Dash (-)

34. Which of the following correctly applies Brahmagupta's multiplication rule?
(a) (-5) x (-4) = -20 (b) (-5) x (-4) = +20 (c) (-5) x 4 =+20 (d) 0 x (-4) = -4

35. How many decimal places does $\frac{3}{40}$ have?
(a) 1 (b) 2 (c) 3 (d) 4

36. The decimal expansion of an irrational number is:
(a) Terminating (b) Non-terminating recurring (c) Non-terminating non-recurring (d) Either terminating or recurring

37. In the square root spiral (Wheel of Theodorus), the hypotenuse of the 5th right triangle is:
(a) $\sqrt{4}$ (b) $\sqrt{5}$ (c) $\sqrt{6}$ (d) $\sqrt{7}$

38. Which of these numbers is rational?
(a) $\sqrt{50}$ (b) 0.1234567891011 12...(Champernowne's number) (c) $\sqrt{(\frac{144}{49})}$ (d) $\sqrt{3}+\sqrt{2}$