

A-3-Z

Roll No

Total No. of Questions : 40]

[Total No. of Printed Pages : 15

10thARM(SZ)JKUT2024

1003-Z

MATHEMATICS

Time : 3 Hours]

[Maximum Marks : 80

Section-A

1 each

1. The number 0.10110111011110 is :

(A) Even number

(B) Rational number

(C) Irrational number

(D) None of these

10thARM(SZ)JKUT2024-1003-Z .

A-3-Z

Turn Over

2. Product of zeroes of the polynomial $4x^2 + 8x$ is :

(A) 2

(B) 0

(C) 4

(D) None of these

3. The pair of linear equations $x + 2y - 4 = 0$ and $2x + 4y - 12 = 0$ are :

(A) Coincident

(B) Intersecting

☒ (C) Parallel

(D) None of these

4. $\sin 2A = 2 \sin A$ is true when $A =$

~~(A)~~ 0°

(B) 45°

(C) 30°

(D) None of these

5. 11th term of the A.P. : $-3, -\frac{1}{2}, 2, \dots$ is :

(A) 28

~~(B)~~ 22

(C) -38

(D) None of these

6. The abscissa of any point on y-axis is :

(A) 1

☒ (B) 0

(C) -1

(D) None of these

7. H.C.F. of 26 and 91 is :

(A) 26

☒ (B) 13

(C) 14

(D) None of these

8. Getting a natural number greater than zero is an example of :

(A) Impossible event

(B) Simple event

☒ (C) Sure event

(D) None of these

9. Volume of sphere is :

(A) $\frac{4}{3}\pi r^2$

☒ (B) $\frac{3}{4}\pi r^3$

(C) $\frac{4}{3}\pi r^3$

(D) None of these

10. Discriminant of the quadratic equation $x^2 + 5\sqrt{5}x - 70 = 0$ is :

(A) 280

☒ (B) 405

(C) 504

(D) None of these

11. Prime factorization of 3825 is $3 \times 3 \times 5 \times 7 \times 17$. (True/False)

12. The sum of first 1000 positive integers is :

☒ (A) 500500

(B) 500005

(C) 100100

(D) None of these

13. $\frac{1}{2}$ can be the probability of an event. (True/False)
14. All triangles are similar. (isosceles. equilateral)
15. Number of tangents that can be drawn on the circle
is
16. If $a_n = (n-1)(2-n)$, then find a_4 .
17. $x=3, y=-2$ is a solution of equation $2x-3y=12$. (True/False)
18. The value of cosec A is always greater than or equal to 1.
(True/False)

Or

$$\sec^2 A = 1 + \dots \text{ for } 0^\circ \leq A \leq 90^\circ.$$

19. Calculate mean of first 7 even numbers.

20. Write the formula for mean of grouped data.

Or

Median of 6, 10, 14, 18, 22, 26, 30 is

Section-B

2 each

21. Solve the pair of linear equations $3x + 4y = 10$ and $2x - 2y = 2$ by elimination method.

22. Find the roots of the quadratic equation $2x^2 - x + \frac{1}{8} = 0$ by factorisation.

23. Given $\sec \theta = \frac{13}{12}$, calculate all other trigonometric ratios.

10thARM(SZ)JKUT2024-1003-Z

A-3-Z

24. Find volume of sphere of radius 3 cm.

Or

Calculate the curved surface area of cylinder of radius 2 cm and height 7 cm.

25. Find the values of y for which the distance between the points

$P(2, -3)$ and $Q(10, y)$ is 10 units.

Or

Check whether $(5, -2)$, $(6, 4)$ and $(7, -2)$ are the vertices of an isosceles triangle.

26. Find a quadratic polynomial, the sum and product of whose zeroes are $\sqrt{2}$ and $\frac{1}{3}$, respectively.

Section-C

3 each

27. Find the coordinates of the points which divide the line segment joining A(-2, 2) and B(2, 8) into four equal parts.
28. Find the area of a quadrant of a circle whose circumference is 22 cm.
29. Prove that the opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

Or

Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that :

$$\angle PTQ = 2\angle OPQ.$$

30. E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that :

$$\triangle ABE \sim \triangle CFB$$

31. The diagonals of a quadrilateral ABCD intersect each other at the point O such that $\frac{AO}{BO} = \frac{CO}{DO}$. Show that ABCD is a trapezium.

32. Prove that $6 + \sqrt{2}$ is irrational. <https://www.jkboseonline.com>

33. An AP consists of 50 terms of which 3rd term is 12 and the last term is 106. Find the 29th term.

Or

Find the sum of the first 15 multiples of 8.

34. One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting :

(i) A face card

(ii) A spade

Section-D

4 eac

35. A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. Find the speed of the train.

Or

Find the value of K so that the quadratic equation $Kx(x-2) + 6 = 0$ has equal roots.

36. A solid iron pole consists of a cylinder of height 220 cm and base diameter 24 cm, which is surmounted by another cylinder of height 60 cm and radius 8 cm. Find the mass of the pole, given that 1 cm^3 of iron has approximately 8 g mass. (Use $\pi = 3.14$)

Or

- From a solid cylinder whose height is 2.4 cm and diameter 1.4 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid to the nearest cm^2 .
37. From the top of a 7 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 45° . Determine the height of the tower.

38. Evaluate :

$$\frac{5 \cos^2 60^\circ + 4 \sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$$

Or

Prove the identity :

$$\frac{\sin \theta - 2 \sin^3 \theta}{2 \cos^3 \theta - \cos \theta} = \tan \theta$$

39. If a line intersects sides AB and AC of a $\triangle ABC$ at D and E respectively and is parallel to BC, prove that :

$$\frac{AD}{AB} = \frac{AE}{AC}$$

Or

A vertical pole of length 6 m casts a shadow 4 m long on the ground and at the same time a tower casts a shadow 28 m long. Find the height of the tower.

10. If the median of the distribution given below is 28.5, find the value of x and y :

Class Interval	Frequency
0-10	5
10-20	x
20-30	20
30-40	15
40-50	y
50-60	5
Total	60

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A-3-Y

Roll No.

Total No. of Questions 40]

[Total No. of Printed Pages 15

10thARM(SZ)JKUT2024

1003-Y

MATHEMATICS

Time : 3 Hours]

[Maximum Marks : 80

Section-A

1 each

1. The number $\sqrt{3}$ is .

(A) Odd number

(B) Rational number

(C) ~~Real number~~

(D) None of these

10thARM(SZ)JKUT2024-1003-Y

Turn Over

A-3-Y

2. Zeroes of the polynomial $3x^2 + 5x - 2$ are :

(A) $\frac{1}{3}, -2$

(B) $-\frac{1}{3}, 2$

(C) $3, \frac{1}{2}$

(D) ~~None of these~~

3. The pair of linear equations $x - 2y = 0$ and $3x + 4y - 20 = 0$ are :

(A) Parallel

(B) Intersecting

(C) ~~Coincident~~

(D) None of these

4. 15th term of the A.P. : 2, 7, 12, is :

(A) 62

(B) 27

(C) 72

(D) None of these

5. $\sin^2 30^\circ + \cos^2 60^\circ$ is equal to :

(A) $\frac{3}{4}$

(B) 1

(C) $\frac{1}{4}$

(D) None of these

10thARM(SZ)JKUT2024—1003-Y

A-3-Y

Turn O

6. The distance of a point from the y-axis is called its :

(A) Ordinate

(B) Coordinate

(C) Abscissa

(D) None of these

7. L.C.M. of 6 and 20 is :

(A) 20

(B) 60

(C) 20

(D) None of these

8. The probability of a leap year selected at random contains 53 Sundays is :

(A) $\frac{53}{366}$

(B) $\frac{1}{7}$

(C) $\frac{53}{365}$

(D) None of these

9. A cylindrical pencil sharpened at one edge is a combination of :

(A) ~~A cone~~ and a cylinder

(B) A hemisphere and a cylinder

(C) Four cylinders

(D) None of these

10thARM(SZ)JKUT2024-1003-Y

A-3-Y

10. Discriminant of the quadratic equation $x^2 + 5x + 5 = 0$ is :

(A) 25

(B) -5

(C) 5

(D) None of these

11. Prime factorization of 5313 is $3 \times 7 \times 11 \times 23$. (True/False)

12. The sum of first 100 positive integers is :

(A) 5000

(B) 5050

(C) 5005

(D) None of these

IRM(SZ)JKUT2024-1003-Y

~~1-X~~

13. $\frac{3}{2}$ can be the probability of an event. (True/False)
14. All squares are (similar/congruent) ✓
15. Two tangents drawn at the end points of diameter of a given circle
are always
16. Write formula for n^{th} terms of an A.P.
17. $x=2, y=3$ is a solution of equation $3x+4y=18$. (True/False) ✓
18. The value of $\sin A$ never exceeds 1. (True/False) ✓

Or

$$\operatorname{cosec}^2 A - \dots\dots\dots = 1 \text{ for } 0^\circ < A \leq 90^\circ.$$

19. Calculate mean of first 8 natural numbers.

20. Write the formula for mode of grouped data.

Or

If mean = 20, mode = 18, then median =

Section-B

2 each

21. Solve the pair of linear equations $\frac{x}{2} + \frac{2y}{3} = -1$ and $x - \frac{y}{3} = 3$ by

elimination method.

22. Find the roots of the quadratic equation $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$ by

factorisation.

Given $\sec\theta = \frac{13}{12}$, calculate all other trigonometric ratios.

IRM(SZ)JKUT2024-1003-Y
B-Y

24. Find volume of sphere of radius 3 cm.

Or

Calculate the curved surface area of cylinder of radius 2 cm and height 7 cm.

25. Find the values of y for which the distance between the points $P(2, -3)$ and $Q(10, y)$ is 10 units.

Or

Check whether $(5, -2)$, $(6, 4)$ and $(7, -2)$ are the vertices of an isosceles triangle.

26. Find a quadratic polynomial, the sum and product of whose zeroes are $\sqrt{2}$ and $\frac{1}{3}$, respectively.

Section-C

3 each

27. Find the coordinates of the points which divide the line segment joining A(-2, 2) and B(2, 8) into four equal parts.
28. Find the area of a quadrant of a circle whose circumference is 22 cm.
29. Prove that the opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

Or

Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that :

$$\angle PTQ = 2\angle OPQ.$$

30. E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that :

$$\triangle ABE \sim \triangle CFB$$

31. The diagonals of a quadrilateral ABCD intersect each other at the point O such that $\frac{AO}{BO} = \frac{CO}{DO}$. Show that ABCD is a trapezium.

32. Prove that $6 + \sqrt{2}$ is irrational. <https://www.jkboseonline.com>

33. An AP consists of 50 terms of which 3rd term is 12 and the last term is 106. Find the 29th term.

Or

Find the sum of the first 15 multiples of 8.

Turn Over

34. One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting :

(i) A face card

(ii) A spade

Section-D

4 each

35. A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. Find the speed of the train.

Or

Find the value of K so that the quadratic equation $Kx(x - 2) + 6 = 0$ has equal roots.

36. A solid iron pole consists of a cylinder of height 220 cm and base diameter 24 cm, which is surmounted by another cylinder of height 60 cm and radius 8 cm. Find the mass of the pole, given that 1 cm^3 of iron has approximately 8 g mass. (Use $\pi = 3.14$)

Or

- From a solid cylinder whose height is 2.4 cm and diameter 1.4 cm. a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid to the nearest cm^2 .
37. From the top of a 7 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 45° . Determine the height of the tower.

Turn Over

38. Evaluate :

$$\frac{5 \cos^2 60^\circ + 4 \sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$$

Or

Prove the identity :

$$\frac{\sin \theta - 2 \sin^3 \theta}{2 \cos^3 \theta - \cos \theta} = \tan \theta$$

39. If a line intersects sides AB and AC of a $\triangle ABC$ at D and E respectively and is parallel to BC, prove that :

$$\frac{AD}{AB} = \frac{AE}{AC}$$

Or

A vertical pole of length 6 m casts a shadow 4 m long on the ground and at the same time a tower casts a shadow 28 m long. Find the height of the tower.

10thARM(SZ)JKUT2024-1003-Y
A-3-Y

10. If the median of the distribution given below is 28.5, find the value of x and y :

Class Interval	Frequency
0-10	5
10-20	x
20-30	20
30-40	15
40-50	y
50-60	5
Total	60

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A-3-X

Roll No.....

Total No. of Questions : 40]

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10thARM(SZ)JKUT2024

1003-X

MATHEMATICS

Time : 3 Hours]

[Maximum Marks : 80

Section-A

1 each

1. Which of the following numbers is an irrational number ?

(A) 0.101

(B) 0.202202220.....

(C) 0.1011

(D) None of these

10thARM(SZ)JKUT2024-1003-X

Turn Over

A-3-X

2. Sum of zeroes of the polynomial $2x^2 - 8x + 6$ is :

(A) -4

(B) 3

(C) 4

(D) None of these

3. The pair of linear equations $2x + 3y - 9 = 0$ and $4x + 6y - 18 = 0$ are :

(A) Coincident

(B) Parallel

(C) Intersecting

(D) None of these

4. 35th term of the A.P. : 21, 18, 15, is :

(A) -18

(B) -71

(C) -81

(D) None of these

5. $\cot 30^\circ$ is equal to :

(A) $\sec 30^\circ$

(B) $\cot 60^\circ$

(C) $\tan 60^\circ$

(D) None of these

6. The distance of a point from the x-axis is called its :

(A) Abscissa

(B) Ordinate

(C) Coordinate

(D) None of these

7. H.C.F. of 7 and 28 is :

(A) 4

(B) 28

(C) 7

(D) None of these

10thARM(SZ)KUT2024-1003-X

A-3-X

8. The probability that it will rain tomorrow is 0.85. What is the probability that it will not rain tomorrow ?

(A) 0.25

(B) 0.145

(C) 0.05

(D) None of these

9. Volume of cone is :

(A) $\pi r^2 h$

(B) $\frac{1}{3} \pi r^2 h$

(C) $3\pi r^2 h$

(D) None of these

10. Discriminant of the quadratic equation $3x^2 - 2\sqrt{6}x + 2 = 0$ is :

(A) 24

(B) 6

(C) 0

(D) None of these

11. Prime factorization of 1771 is $7 \times 11 \times 13$. (True/False)

12. The sum of first 51 positive integers is :

(A) 1316

(B) 1326

(C) 1362

(D) None of these

13. -0.5 can be the probability of an event. (True/False)
14. All circles are (congruent, similar)
15. Number of tangents that can be drawn from a point outside the circle
is
16. Write formula for sum to n terms of an A.P.
17. $x=0, y=2$ is a solution of equation $y-2x=-2$. (True/False) ✓
18. The value of $\cos A$ exceeds 1. (True/False)

Or

$$\sin^2 A + \dots = 1 \text{ for } 0^\circ \leq A \leq 90^\circ.$$

19. Calculate mean of first 6 prime numbers.
20. Write the formula for class mark of grouped data.

Or

If mean = 15.6, median = 15.73, then mode =

Section-B

2 each

21. Solve the pair of linear equations $3x - 5y - 4 = 0$ and $9x = 2y + 7$ by substitution method.
22. Find the roots of the quadratic equation $2x^2 + x - 6 = 0$ by factorisation.
23. Given $\sec \theta = \frac{13}{12}$, calculate all other trigonometric ratios.

24. Find volume of sphere of radius 3 cm.

Or

Calculate the curved surface area of cylinder of radius 2 cm and height 7 cm.

25. Find the values of y for which the distance between the points $P(2, -3)$ and $Q(10, y)$ is 10 units.

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26. Find a quadratic polynomial, the sum and product of whose zeroes are $\sqrt{2}$ and $\frac{1}{3}$, respectively.

Turn Over

Section-C**3 each**

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Or

Find the sum of the first 15 multiples of 8.

- ★. One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting :

(i) A face card

(ii) A spade

Section-D

4 each

35. A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. Find the speed of the train.

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A-3-X

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Turn Over

38. Evaluate :

$$\frac{5 \cos^2 60^\circ + 4 \sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$$

Or

Prove the identity :

$$\frac{\sin \theta - 2 \sin^3 \theta}{2 \cos^3 \theta - \cos \theta} = \tan \theta$$

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Or

A vertical pole of length 6 m casts a shadow 4 m long on the ground and at the same time a tower casts a shadow 28 m long. Find the height of the tower.

10. If the median of the distribution given below is 28.5, find the value of x and y :

Class Interval	Frequency
0-10	5
10-20	x
20-30	20
30-40	15
40-50	y
50-60	5
Total	60

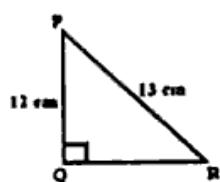
OBJECTIVE TYPE QUESTIONS (EACH CARRY 1 MARKS)

- Which of the following can be end with the digit 0.
a). $(2 \times 3)^4$ b). $(2 \times 5)^4$ c). $(2 \times 7)^4$ d). $(2 \times 12)^4$
- State fundamental theorem of arithmetic.
- If p is a prime number and p divides a^2 , then p divides a . (True/False).
- The pair of equations $3x+5y=3$ and $6x+ky=8$ do not have solutions, if k
(a) 5 (b) 10 (c) $\neq 5$ (d) $\neq 10$.
- If one of the zero of the quadratic polynomial $x^2 + 3x + k$ is 2 then the value of k is
(a) 10 (b) -10 (c) 5 (d) -5
- The number of polynomial having zeroes as -2 and 5 is
(a) 1 (b) 2 (c) 3 (d) more than 3
- The zeroes of the quadratic polynomial $x^2 + px + p = 0$, $p \neq 0$ are
(a). both equal
(b). both cannot be positive
(c). both unequal
(d). both cannot be negative
- The sum of the reciprocals of the roots of the equation $x^2 + px + q = 0$ is
(a) $\frac{p}{q}$ (b) $-\frac{p}{q}$ (c) $\frac{q}{p}$ (d) $-\frac{q}{p}$
- The roots of the quadratic equations $3x^2 - 4x + 3 = 0$
(a) real and unequal
(b) real and equal
(c) imaginary
(d) none of these
- For the equation $x^2 - 2x + 1 = 0$, the value of $x + \frac{1}{x}$ is
(a) -1 (b) 1 (c) 2 (d) -2
- The roots of the quadratic equation $x^2 - 2x - (r^2 - 1) = 0$ are :
(a) $1-r$, $r-1$
(b) $1-r$, $r+1$
(c) 1 , r
(d) $1-r$, r
- $(\sin 30^\circ + \cos 60^\circ) - (\sin 60^\circ + \cos 30^\circ) =$
(a) 0 (b) $1 + \frac{2}{\sqrt{3}}$ (c) $1 - \sqrt{3}$ (d) $1 + \sqrt{3}$
- If triangle ABC is right angled at C, then the value of $\cos(A+B)$ is
(a) 0 (b) 1 (c) $\frac{1}{2}$ (d) $\frac{\sqrt{3}}{2}$
- Define angle of elevation.
- Give one example of application of trigonometry.
- Define sure event.

17. A bag contains 3 red balls and 5 green balls . If we take a ball from the bag, then the probability of getting red ball only=.....
18. If two dice are thrown in the air, the probability of getting sum as 3 will be.....
19. A card is selected at random from a well shuffled deck of 52 cards. The probability of being a face card is.....
20. If an event cannot occurs then Its probability is.....

VERY SHORT ANSWER TYPE (EACH CARRY 2 MARKS)

21. Given that $HCF(306,657)=9$, find $LCM(306,657)$.
22. Find the quadratic polynomial whose sum of zeroes is 4 and product of zeroes is 1.
23. Solve $2x+3y=11$ and $2x-4y=-24$.
24. Find the roots of the quadratic equation $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$ by factorization.
25. From given fig. find $\tan P - \cot R$.



26. A beg contains 3 red balls and 5 black balls. A ball is drawn at random from the bag. What is the probability that the drawn ball is (i) red (ii) not red.

SHORTANSWER TYPE (EACH CARRY 3 MARKS)

27. Prove that $\sqrt{2}$ is Irrational.
28. Find the zeroes of the quadratic polynomial $6x^2 - 3 - 7x = 0$ and verify the relationship between the zeroes and the coefficients.
29. Meena went to the bank to withdraw Rs. 2000. She asked the cashier to give her Rs. 50 and Rs 100 notes only. Meena got 25 notes in all. Find how many notes of Rs 50 and Rs 100 she received. <https://www.jkboseonline.com>
30. Find the values of k for each of the following quadratic equation $2x^2 + kx + 3 = 0$, have two equal roots.
31. Is it possible to design a rectangular park of perimeter 80m and $400m^2$? If so, find its length and breadth.
32. Prove that $1 + \tan^2 A = \sec^2 A$.
33. A game of chance consists of spinning an arrow which comes to rest pointing at one of the numbers 1, 2, 3, 4, 5, 6, 7, 8 (see Fig. 15.5), and these are equally likely outcomes. What is the probability that it will point at
 - (i) 8 ?
 - (ii) an odd number?
 - (iii) a number greater than 2?
 - (iv) a number less than 9?



34. Two dice , one blue and one grey , are thrown at same time. Write down all the possible outcomes. What is the probability that the sum of the two numbers appearing on the top of the dice is
(i)8 (ii)13 (iii) less than or equal to 12 ?

LONG ANSWER TYPE QUESTIONS (EACH CARRY 4 MARKS)

35. The sum of two digit number is 9. Also, nine times the number is twice the number obtained by reversing the order of the digits. Find the number.
36. A train travels a distance of 480 km at a uniform speed. If the speed of the train is 8 km/hr. less, then it would have taken 3 hr more to cover the same distance. We need to find the speed of the train.
37. Prove that $\frac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \frac{1}{\sec\theta - \tan\theta}$.
38. Prove that $\frac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta} = \tan\theta$.
39. A straight highway leads to the foot of the tower. A man standing at the top of the tower observes a car at an angle of depression of 30° , which is approaching the foot of the tower with a uniform speed. Six seconds later, the angle of depression of the car is found to be 60° . Find the time taken by the car to reach the foot of the tower from this point.
40. From a bridge across a river, the angles of depressions of the opposite sides of the river are 30° and 45° , respectively. If the bridge is at a height of 3 m from the banks, find the width of the river.