jeeinfo
Your JEE Guide

CBSE Class X · Mathematics Standard (041)

Sample Question Paper 4 · Session 2026-27

Time allowed: 3 hours **Maximum marks: 80**

© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission.
This is an original practice paper written to the official CBSE 2026-27 design; it is not issued by CBSE.

General instructions:

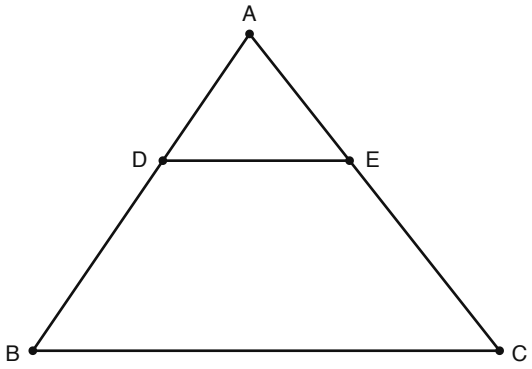
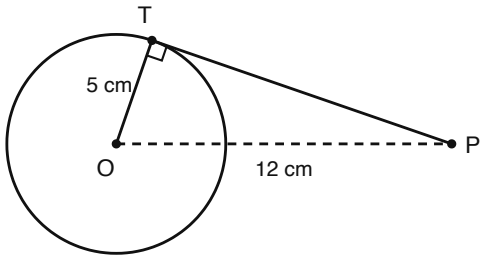
1. This question paper contains 38 questions. All questions are compulsory.
2. This question paper is divided into five Sections: A, B, C, D and E.
3. In Section A, Questions 1 to 18 are multiple choice questions (MCQs) and Questions 19 and 20 are Assertion–Reason based questions of 1 mark each.
4. In Section B, Questions 21 to 25 are very short answer (VSA) type questions carrying 2 marks each.
5. In Section C, Questions 26 to 31 are short answer (SA) type questions carrying 3 marks each.
6. In Section D, Questions 32 to 35 are long answer (LA) type questions carrying 5 marks each.
7. In Section E, Questions 36 to 38 are case study based questions carrying 4 marks each.
8. There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 2 questions in Section C, 2 questions in Section D, and in the 2-mark sub-parts of Section E.
9. Draw neat figures wherever required. Take π = 22/7 wherever required, if not stated.
10. Use of calculators is not allowed.

Section A

1.	The LCM of 12 and 42 is 84. Their HCF is: (A) 2 (B) 12 (C) 6 (D) 3	1
2.	The prime factorisation of 156 is: (A) $2^2 \times 3 \times 13$ (B) $2^2 \times 3^2 \times 13$ (C) $2 \times 3 \times 13$ (D) $2^3 \times 13$	1
3.	The zeroes of $x^2 - 3$ are: (A) 3 and 0 (B) $\pm\sqrt{3}$ (C) ± 3 (D) $\sqrt{3}$ only	1
4.	If the sum of the zeroes of $kx^2 + 2x + 3k$ equals their product, then k is: (A) $\frac{3}{2}$ (B) $\frac{2}{3}$ (C) $-\frac{3}{2}$ (D) $-\frac{2}{3}$	1

5.	The pair $x + 2y = 3$ and $5x + ky = 7$ has a unique solution when: (A) $k = 10$ (B) $k = 5$ (C) $k \neq 5$ (D) $k \neq 10$	1
6.	Which of these equations has two distinct real roots? (A) $x^2 - 3x + 2 = 0$ (B) $2x^2 + 3 = 0$ (C) $x^2 - 4x + 4 = 0$ (D) $x^2 + x + 1 = 0$	1
7.	If k, 2k – 1 and 2k + 1 are consecutive terms of an AP, then k is: (A) 1 (B) 3 (C) –3 (D) 2	1
8.	The sum of the first 20 natural numbers is: (A) 190 (B) 220 (C) 210 (D) 200	1
9.	The point dividing the line segment joining (4, –3) and (8, 5) internally in the ratio 3 : 1 is: (A) (6, 1) (B) (7, –3) (C) (7, 3) (D) (5, –1)	1
10.	The distance between (0, 5) and (–5, 0) is: (A) $5\sqrt{2}$ (B) $2\sqrt{5}$ (C) 5 (D) 10	1
11.	If $\sin A = \frac{1}{2}$ and A is acute, then $\cot A$ is: (A) $\frac{1}{\sqrt{3}}$ (B) $\sqrt{3}$ (C) 1 (D) $\frac{\sqrt{3}}{2}$	1
12.	$(\sec A + \tan A)(1 - \sin A)$ is equal to: (A) $\sec A$ (B) $\sin A$ (C) $\operatorname{cosec} A$ (D) $\cos A$	1
13.	A pole 6 m high casts a shadow $2\sqrt{3}$ m long. The angle of elevation of the Sun is: (A) 30° (B) 90° (C) 60° (D) 45°	1

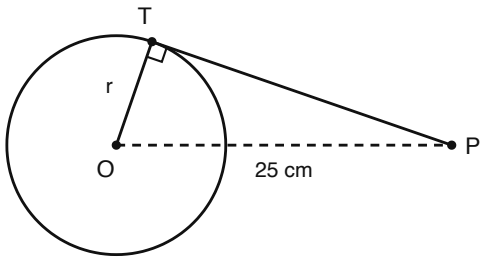
© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission. Not an official CBSE paper.

14.	In $\triangle ABC$, $DE \parallel BC$. If AD = x, DB = x – 2, AE = x + 2 and EC = x – 1, then x is:  (A) 6 (B) 4 (C) 3 (D) 2	1
15.	TP is a tangent at T to a circle with centre O and radius 5 cm. If OP = 12 cm, then TP is:  (A) 13 cm (B) $\sqrt{17}$ cm (C) 7 cm (D) $\sqrt{119}$ cm	1
16.	The area of a circle whose circumference is 44 cm is: (use $\pi = \frac{22}{7}$) (A) 154 cm² (B) 44 cm² (C) 308 cm² (D) 616 cm²	1
17.	Two cubes, each of volume 64 cm³, are joined end to end. The surface area of the resulting cuboid is: (A) 96 cm² (B) 128 cm² (C) 160 cm² (D) 192 cm²	1
18.	A letter of the English alphabet is chosen at random. The probability that it is a vowel is: (A) $\frac{5}{26}$ (B) $\frac{21}{26}$ (C) $\frac{5}{21}$ (D) $\frac{1}{26}$	1

© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission. Not an official CBSE paper.

19.	**Assertion (A):** –5 is a zero of the polynomial $x^2 + 3x - 10$. **Reason (R):** If p(k) = 0, then k is a zero of the polynomial p(x). (A) Both Assertion (A) and Reason (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.	1
20.	**Assertion (A):** The probability of an impossible event is 0. **Reason (R):** The probability of a sure event is 0. (A) Both Assertion (A) and Reason (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.	1

Section B

21.	Show that 12^n cannot end with the digit 0 for any natural number n.	2
22.	Find the zeroes of $3x^2 - x - 4$. **OR** Half the perimeter of a rectangular garden is 36 m, and its length is 4 m more than its width. Find its dimensions.	2
23.	Find the values of y for which the distance between P(2, –3) and Q(10, y) is 10 units.	2
24.	If $\tan(A + B) = \sqrt{3}$ and $\tan(A - B) = \frac{1}{\sqrt{3}}$, with $0^\circ < A + B \leq 90^\circ$ and A > B, find A and B. **OR** Evaluate: $2\sin^2 30^\circ - 3\cos^2 45^\circ + \tan^2 60^\circ$.	2
25.	From a point P, the length of the tangent PT to a circle is 24 cm, and the distance of P from the centre O is 25 cm. Find the radius of the circle. 	2

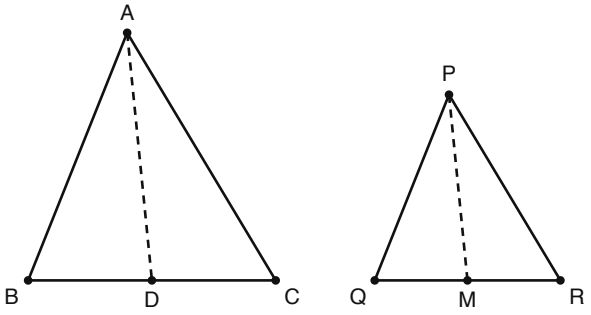
Section C

26.	Prove that $\sqrt{3}$ is irrational.	3

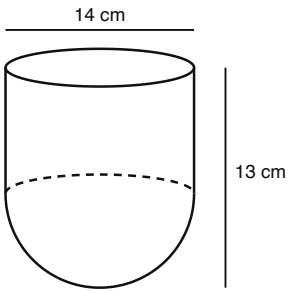
© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission. Not an official CBSE paper.

27.	Find the zeroes of $4u^2 + 8u$ and verify the relationship between the zeroes and the coefficients.	3
28.	The sum of a two-digit number and the number obtained by reversing its digits is 66. If the digits differ by 2, find the number. How many such numbers are there? **OR** A fraction becomes $\frac{1}{3}$ when 1 is subtracted from the numerator, and $\frac{1}{4}$ when 8 is added to the denominator. Find the fraction.	3
29.	Prove that the angle between the two tangents drawn from an external point to a circle is supplementary to the angle subtended at the centre by the line segment joining the points of contact.	3
30.	Prove that $\frac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = \operatorname{cosec} A + \cot A$. **OR** Prove that $\sec A(1 - \sin A)(\sec A + \tan A) = 1$.	3
31.	A box contains 90 discs numbered 1 to 90. One disc is drawn at random. Find the probability that it bears (i) a two-digit number, (ii) a perfect square, (iii) a number divisible by 5.	3

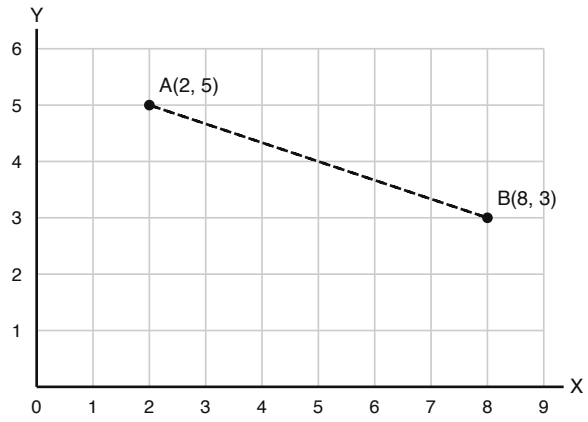
Section D

32.	The diagonal of a rectangular field is 60 m more than its shorter side. If the longer side is 30 m more than the shorter side, find the sides of the field. **OR** An express train takes 1 hour less than a passenger train to travel 132 km between two cities. The average speed of the express train is 11 km/h more than that of the passenger train. Find the average speeds of the two trains.	5
33.	The sum of the 4th and 8th terms of an AP is 24, and the sum of its 6th and 10th terms is 44. Find the first three terms of the AP and the sum of its first 20 terms.	5
34.	AD and PM are medians of triangles ABC and PQR respectively, and $\triangle ABC \sim \triangle PQR$. Prove that $\frac{AB}{PQ} = \frac{AD}{PM}$. 	5

© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission. Not an official CBSE paper.

35.	A vessel is in the form of a hollow hemisphere surmounted by a hollow cylinder. The diameter of the hemisphere is 14 cm and the total height of the vessel is 13 cm. Find the inner surface area of the vessel. (use $\pi = \frac{22}{7}$)  **OR** A wooden pen stand is a cuboid 15 cm × 10 cm × 3.5 cm with four conical depressions to hold pens. Each depression has radius 0.5 cm and depth 1.4 cm. Find the volume of wood in the stand. (use $\pi = \frac{22}{7}$)	5

Section E

36.	**Case study 1.** A school ground is marked on a grid in which 1 unit is 1 m. Aman stands at A(2, 5) and Bina at B(8, 3).  (i) Find the distance between Aman and Bina. *[1]* (ii) Kiran stands exactly midway between them. Find Kiran's position. *[1]* (iii) Find the point on the x-axis that is equidistant from A and B. *[2]* **OR** (iii) Find the point that divides AB in the ratio 2 : 1. *[2]*	4

© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission. Not an official CBSE paper.

37. **Case study 2.** A survey of 40 households recorded their daily water use. [4]

Water (litres)	0–50	50–100	100–150	150–200	200–250
Households	6	10	12	8	4

(i) Write the class mark of the class 100–150. *[1]*

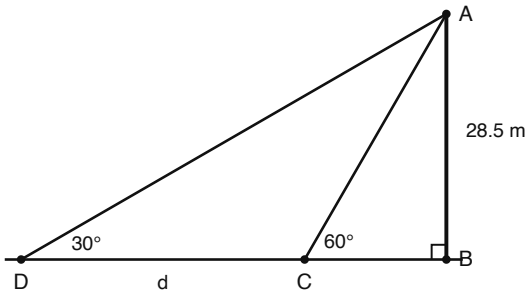
(ii) Write the modal class. *[1]*

(iii) Find the mean daily water use. *[2]*

OR

(iii) Find the median daily water use. *[2]*

38. **Case study 3.** A boy whose eyes are 1.5 m above the ground stands some distance from a 30 m tall building. As he walks towards the building, the angle of elevation of its top from his eyes changes from 30° to 60°. (In the figure, the line DCB is at the level of his eyes.) [4]



(i) Find the height of the top of the building above his eye level. *[1]*

(ii) Find his distance from the building at the start. *[1]*

(iii) Find the distance he walked towards the building. *[2]*

OR

(iii) Find his distance from the building at the end. *[2]*

© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission. Not an official CBSE paper.

Answers and Marking Scheme

Marks for each step are shown in brackets. Any correct alternative method gets full credit.

Section A

1. **(C)** 6. *Working:* HCF $= \frac{12\times 42}{84} = 6$.

2. **(A)** $2^2 \times 3 \times 13$. *Working:* $156 = 4 \times 39 = 2^2 \times 3 \times 13$.

3. **(B)** $\pm\sqrt{3}$. *Working:* $x^2 = 3 \Rightarrow x = \pm\sqrt{3}$.

4. **(D)** $-\frac{2}{3}$. *Working:* Sum $= -\frac{2}{k}$, product $= 3$. $-\frac{2}{k} = 3 \Rightarrow k = -\frac{2}{3}$.

5. **(D)** $k \neq 10$. *Working:* Unique solution when $\frac{1}{5} \neq \frac{2}{k}$, i.e. $k \neq 10$.

6. **(A)** $x^2 - 3x + 2 = 0$. *Working:* Discriminants: 1, –3, 0, –24. Only the first is positive.

7. **(B)** 3. *Working:* $2(2k - 1) = k + 2k + 1 \Rightarrow k = 3$.

8. **(C)** 210. *Working:* $\frac{20\times 21}{2} = 210$.

9. **(C)** (7, 3). *Working:* $\left(\frac{3(8)+4}{4}, \frac{3(5)-3}{4}\right) = (7, 3)$.

10. **(A)** $5\sqrt{2}$. *Working:* $\sqrt{25 + 25} = 5\sqrt{2}$.

11. **(B)** $\sqrt{3}$. *Working:* A = 30°, $\cot 30^\circ = \sqrt{3}$.

12. **(D)** $\cos A$. *Working:* $\frac{1+\sin A}{\cos A}(1 - \sin A) = \frac{\cos^2 A}{\cos A} = \cos A$.

13. **(C)** 60°. *Working:* $\tan\theta = \frac{6}{2\sqrt{3}} = \sqrt{3}$, θ = 60°.

14. **(B)** 4. *Working:* $\frac{x}{x-2} = \frac{x+2}{x-1} \Rightarrow x^2 - x = x^2 - 4 \Rightarrow x = 4$.

15. **(D)** $\sqrt{119}$ cm. *Working:* $TP = \sqrt{12^2 - 5^2} = \sqrt{119}$ cm.

16. **(A)** 154 cm². *Working:* $2\pi r = 44 \Rightarrow r = 7$; area $= \frac{22}{7} \times 49 = 154$ cm².

17. **(C)** 160 cm². *Working:* Edge 4 cm; cuboid 8 × 4 × 4: $2(32 + 16 + 32) = 160$ cm².

18. **(A)** $\frac{5}{26}$. *Working:* 5 vowels out of 26 letters.

19. **(A)** Both Assertion (A) and Reason (R) are true and R is the correct explanation of A. *Working:* $p(-5) = 25 - 15 - 10 = 0$, and R is the definition that explains A.

20. **(C)** A is true but R is false. *Working:* A is true. R is false: the probability of a sure event is 1.

Section B

21. $12^n = 2^{2n} \times 3^n$ (1). A number ending in 0 must have 5 as a prime factor; by the uniqueness of prime factorisation, 12^n has none, so it cannot end in 0 (1).

22. $3x^2 - 4x + 3x - 4 = (3x - 4)(x + 1)$ (1). Zeroes: $\frac{4}{3}$ and –1 (1).

OR l + w = 36 and l – w = 4 (1). So l = 20 m and w = 16 m (1).

23. $64 + (y + 3)^2 = 100$ (1), so $y + 3 = \pm 6$: y = 3 or y = –9 (1).

24. $A + B = 60^\circ$, $A - B = 30^\circ$ (1). So $A = 45^\circ$, $B = 15^\circ$ (1).

© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission. Not an official CBSE paper.

OR $2 \cdot \frac{1}{4} - 3 \cdot \frac{1}{2} + 3$ (1) $= \frac{1}{2} - \frac{3}{2} + 3 = 2$ (1).

25. OT ⊥ PT (1), so $OT = \sqrt{25^2 - 24^2} = 7$ cm (1).

Section C

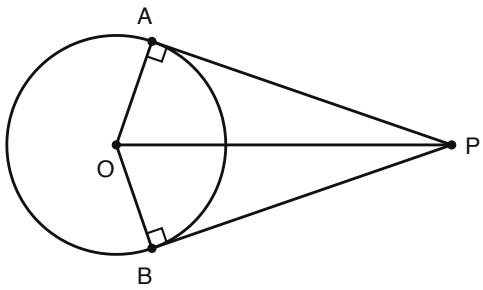
26. Assume $\sqrt{3} = \frac{a}{b}$, with a, b co-prime integers (½). Then $a^2 = 3b^2$, so 3 divides a^2 and hence a; write a = 3c (1). Then $b^2 = 3c^2$, so 3 divides b (1). This contradicts a, b being co-prime, so $\sqrt{3}$ is irrational (½).

27. $4u(u + 2)$: zeroes 0 and –2 (1). Sum $= -2 = -\frac{8}{4}$ (1). Product $= 0 = \frac{0}{4}$ (1).

28. Let the digits be x (tens) and y (units): 11(x + y) = 66, so x + y = 6 (1). x – y = 2 gives 42; y – x = 2 gives 24 (1). There are two such numbers: 42 and 24 (1).

OR Let it be $\frac{x}{y}$: y = 3x – 3 and 4x = y + 8 (1). So 4x = 3x + 5, x = 5 (1), y = 12. The fraction is $\frac{5}{12}$ (1).

29. Let PA, PB be tangents from P to a circle with centre O (figure, ½). $\angle OAP = \angle OBP = 90^\circ$ (radius ⊥ tangent) (1). The angles of quadrilateral OAPB add up to 360° (½), so $\angle APB + \angle AOB = 360^\circ - 180^\circ = 180^\circ$ (1).



30. Divide numerator and denominator by $\sin A$: $\frac{\cot A + \operatorname{cosec} A - 1}{\cot A - \operatorname{cosec} A + 1}$ (1). Write 1 in the numerator as $\operatorname{cosec}^2 A - \cot^2 A$: numerator $= (\cot A + \operatorname{cosec} A)(1 - \operatorname{cosec} A + \cot A)$ (1). The second factor cancels with the denominator, leaving $\operatorname{cosec} A + \cot A$ (1).

OR $(\sec A + \tan A)(1 - \sin A) = \frac{(1+\sin A)(1-\sin A)}{\cos A} = \frac{\cos^2 A}{\cos A} = \cos A$ (2). So the expression is $\sec A \cos A = 1$ (1).

31. (i) 10 to 90: 81 discs, $\frac{81}{90} = \frac{9}{10}$ (1). (ii) 1, 4, …, 81: 9 discs, $\frac{1}{10}$ (1). (iii) 5, 10, …, 90: 18 discs, $\frac{1}{5}$ (1).

Section D

32. Let the shorter side be x m (½). $x^2 + (x + 30)^2 = (x + 60)^2$ (1). $x^2 - 60x - 2700 = 0$ (1½). $(x - 90)(x + 30) = 0$ (1). x = 90; the sides are 90 m and 120 m (1).

OR Let the passenger train run at x km/h (½). $\frac{132}{x} - \frac{132}{x+11} = 1$ (1). $x^2 + 11x - 1452 = 0$ (1½). $(x + 44)(x - 33) = 0$ (1). Speeds: 33 km/h and 44 km/h (1).

33. $2a + 10d = 24$ and $2a + 14d = 44$ (1+1). So d = 5 and a = –13 (1). First three terms: –13, –8, –3 (1). $S_{20} = 10(-26 + 19 \times 5) = 690$ (1).

© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission. Not an official CBSE paper.

34. From the similarity, $\frac{AB}{PQ} = \frac{BC}{QR}$ and $\angle B = \angle Q$ (1). Since D and M are midpoints, $\frac{BC}{QR} = \frac{2BD}{2QM} = \frac{BD}{QM}$ (1). So $\frac{AB}{PQ} = \frac{BD}{QM}$ with the included angles B and Q equal (1). Hence $\triangle ABD \sim \triangle PQM$ (SAS similarity) (1), and $\frac{AB}{PQ} = \frac{AD}{PM}$ (1).

35. r = 7 cm; height of the cylinder = 13 – 7 = 6 cm (1). Inner CSA of cylinder $= 2\pi rh = 2 \times \frac{22}{7} \times 7 \times 6 = 264$ cm² (1½). Inner surface of hemisphere $= 2\pi r^2 = 308$ cm² (1½). Total = 572 cm² (1).

OR Cuboid $= 15 \times 10 \times 3.5 = 525$ cm³ (1). One cone $= \frac{1}{3} \times \frac{22}{7} \times 0.25 \times 1.4 = \frac{11}{30}$ cm³ (1½). Four cones $= \frac{22}{15} \approx 1.47$ cm³ (1). Wood $\approx 525 - 1.47 = 523.53$ cm³ (1½).

Section E

36. (i) $\sqrt{6^2 + 2^2} = \sqrt{40} = 2\sqrt{10}$ m.
(ii) $(5, 4)$.
(iii) $(x-2)^2 + 25 = (x-8)^2 + 9 \Rightarrow 12x = 44$, so the point is $\left(\frac{11}{3}, 0\right)$. **OR** $\left(\frac{2(8)+2}{3}, \frac{2(3)+5}{3}\right) = \left(6, \frac{11}{3}\right)$.

37. (i) 125.
(ii) 100–150 (frequency 12).
(iii) $\sum fx = 150 + 750 + 1500 + 1400 + 900 = 4700$; mean $= \frac{4700}{40} = 117.5$ litres. **OR** N/2 = 20; cumulative frequencies 6, 16, 28, so the median class is 100–150. Median $= 100 + \frac{20-16}{12} \times 50 \approx 116.67$ litres.

38. (i) 30 – 1.5 = 28.5 m.
(ii) $28.5 \cot 30^\circ = 28.5\sqrt{3}$ m.
(iii) $28.5\left(\sqrt{3} - \frac{1}{\sqrt{3}}\right) = 28.5 \times \frac{2}{\sqrt{3}} = 19\sqrt{3} \approx 32.9$ m. **OR** $28.5 \cot 60^\circ = \frac{28.5}{\sqrt{3}} = 9.5\sqrt{3} \approx 16.45$ m.

© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission. Not an official CBSE paper.