CBSE 2025 Maths Standard — Set 1 — Answer Key

English Medium

Time Allowed: 3 Hours | Maximum Marks: 80

General Instructions:

1. This question paper contains 38 questions. All questions are compulsory.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 6 questions carrying 2 marks each.
4. Section C has 6 questions carrying 3 marks each.
5. Section D has 4 questions carrying 5 marks each.
6. Section E has 3 case-study based questions carrying 4 marks each.
7. Draw neat figures wherever required.

Section A

Multiple Choice Questions (1 mark each)

Q.1 [1 mark]

If α and β are the zeroes of the polynomial $3x^2 + 6x + k$ such that $\alpha + \beta + \alpha\beta = -2/3$, then the value of k is:

(a) −8

(b) 8

(c) −4

(d) 4 <<

Explanation:

For polynomial $3x^2 + 6x + k$: $\alpha + \beta = -6/3 = -2$, $\alpha\beta = k/3$.

Given $\alpha + \beta + \alpha\beta = -2/3$: $-2 + k/3 = -2/3 \rightarrow k/3 = -2/3 + 2 = 4/3 \rightarrow k = 4$.

Answer is (D).

Q.2 [1 mark]

If x = 1 and y = 2 is a solution of the pair of linear equations 2x − 3y + a = 0 and 2x + 3y − b = 0, then:

(a) a = 2b

(b) 2a = b <<

(c) a + 2b = 0

(d) 2a + b = 0

Explanation:

Substituting x=1, y=2: First equation: 2 − 6 + a = 0 → a = 4.

Second equation: 2 + 6 − b = 0 → b = 8.

Check: 2a = 8 = b.

So 2a = b.

Answer is (B).

Q.3 [1 mark]

The mid-point of the line segment joining the points P(−4, 5) and Q(4, 6) lies

on:

(a) x-axis

(b) y-axis <<

(c) origin

(d) neither x-axis nor y-axis

Explanation:

Mid-point = ((−4+4)/2, (5+6)/2) = (0, 5.5).

Since x-coordinate is 0 and y-coordinate is non-zero, the point lies on the y-axis.

Answer is (B).

Q.4 [1 mark]

If θ is an acute angle and 7 + 4 sin θ = 9, then the value of θ is:

(a) 90°

(b) 30° <<

(c) 45°

(d) 60°

Explanation:

7 + 4 sin θ = 9 → 4 sin θ = 2 → sin θ = 1/2.

Since θ is acute, θ = 30°.

Answer is (B).

Q.5 [1 mark]

The value of $\tan^2\theta - (1/\cos\theta) \times \sec\theta$ is:

(a) 1

(b) 0

(c) −1 <<

(d) 2

Explanation:

1/cos θ = sec θ.

So the expression = $\tan^2\theta - \sec\theta \times \sec\theta = \tan^2\theta - \sec^2\theta = -(\sec^2\theta - \tan^2\theta) = -1$.

Answer is (C).

Q.6 [1 mark]

If HCF(98, 28) = m and LCM(98, 28) = n, then the value of n − 7m is:

(a) 0
(b) 28
(c) 98 <<
(d) 198

Explanation:
98 = 2 × 7², 28 = 2² × 7.
HCF = 2 × 7 = 14 (m = 14).
LCM = 2² × 7² = 196 (n = 196).
n − 7m = 196 − 98 = 98.
Answer is (C).

Q.7 [1 mark]

The tangents drawn at the extremities of the diameter of a circle are always:

(a) parallel <<
(b) perpendicular
(c) equal
(d) intersecting

Explanation:
Tangents at both ends of a diameter are perpendicular to the diameter, so they are parallel to each other.
Answer is (A).

Q.8 [1 mark]

In triangles ABC and DEF, ∠B = ∠E, ∠F = ∠C and AB = 3DE. Then, the two triangles are:

(a) congruent but not similar
(b) congruent as well as similar
(c) neither congruent nor similar
(d) similar but not congruent <<

Explanation:

$\angle B = \angle E$ and $\angle F = \angle C \rightarrow$ AA similarity $\rightarrow \triangle ABC \sim \triangle DEF$.

But $AB = 3DE$ (sides unequal) $\rightarrow$ not congruent.

Answer is (D).

Q.9 [1 mark]

If $(-1)^n + (-1)^8 = 0$, then n is:

(a) any positive integer

(b) any negative integer

(c) any odd number <<

(d) any even number

Explanation:

$(-1)^8 = 1$.

So $(-1)^n + 1 = 0 \rightarrow (-1)^n = -1$.

This happens when n is any odd number.

Answer is (C).

Q.10 [1 mark]

Two polynomials are shown in the graph below. The number of distinct zeroes of both the polynomials is:

(a) 3

(b) 5

(c) 2

(d) 4 <<

Explanation:

From the graph, the two polynomial curves cross the x-axis at a total of 4 distinct points.

Answer is (D).

Q.11 [1 mark]

If the sum of first m terms of an AP is $2m^2 + 3m$, then its second term is:

(a) 10

(b) 9 <<

(c) 12

(d) 4

Explanation:

S_m = 2m² + 3m. $a_2 = S_2 - S_1 = (2\times4 + 6) - (2 + 3) = 14 - 5 = 9$. Answer is (B).

Q.12 [1 mark]

Mode and Mean of a data are 15x and 18x, respectively. Then the median of the data is:

(a) x

(b) 11x

(c) 17x <<

(d) 34x

Explanation:

3 × Median = Mode + 2 × Mean = 15x + 36x = 51x → Median = 17x. Answer is (C).

Q.13 [1 mark]

A card is selected at random from a deck of 52 playing cards. The probability of it being a red face card is:

(a) 3/13

(b) 2/13

(c) 1/2

(d) 3/26 <<

Explanation:

Red face cards = 6 (3 from Hearts + 3 from Diamonds).

P = 6/52 = 3/26.

Answer is (D).

Q.14 [1 mark]

Which of the following is a rational number between √3 and √5?

(a) 1.4142387954012....

(b) 2.326

(c) π

(d) 1.857142 <<

Explanation:

√3 ≈ 1.732, √5 ≈ 2.236.

(A) ≈ 1.414 < √3.

(B) ≈ 2.327 > √5.

(C) π ≈ 3.14, irrational and > √5.

(D) 1.857142 is terminating (rational) and lies between √3 and √5.

Answer is (D).

Q.15 [1 mark]

If a sector of a circle has an area of 40π sq. units and a central angle of 72°, the radius of the circle is:

(a) 200 units

(b) 100 units

(c) 20 units

(d) 10√2 units <<

Explanation:

Area of sector = (θ/360)πr².

40π = (72/360)πr² → 40 = r²/5 → r² = 200 → r = 10√2.

Answer is (D).

Q.16 [1 mark]

In the given figure, PA is a tangent from an external point P to a circle with centre O. If ∠POB = 115°, then ∠APO is equal to:

(a) 25° <<

(b) 65°

(c) 90°

(d) 35°

Explanation:

PA is tangent → ∠OAP = 90°.

∠POA = 180° − 115° = 65° (straight line through diameter).

In △OAP: ∠APO = 180° − 90° − 65° = 25°.

Answer is (A).

Q.17 [1 mark]

A kite is flying at a height of 150 m from the ground. It is attached to a string inclined at an angle of 30° to the horizontal. The length of the string is:

(a) 100√3 m

(b) 300 m <<

(c) 150√2 m

(d) 150√3 m

Explanation:

sin 30° = 150/L → 1/2 = 150/L → L = 300 m. Answer is (B).

Q.18 [1 mark]

A piece of wire 20 cm long is bent into the form of an arc of a circle of radius 60/π cm. The angle subtended by the arc at the centre of the circle is:

(a) 30°

(b) 60° <<

(c) 90°

(d) 50°

Explanation:

Arc length = (θ/360) × 2πr.

20 = (θ/360) × 2π × (60/π) = (θ/360) × 120.

θ = 360 × 20/120 = 60°.

Answer is (B).

Q.19 [1 mark]

Assertion (A): The probability of selecting a number at random from the numbers 1 to 20 is 1.

Reason (R): For any event E, if P(E) = 1, then E is called a sure event.

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A). <<

(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).

(c) Assertion (A) is true, but Reason (R) is false.

(d) Assertion (A) is false, but Reason (R) is true.

Explanation:

Selecting any number from 1 to 20 is a sure event (P = 20/20 = 1).

Both A and R are true, and R correctly explains why P = 1 means a sure event.

Answer is (A).

Q.20 [1 mark]

Assertion (A): If we join two hemispheres of same radius along their bases, then we get a sphere.

Reason (R): Total Surface Area of a sphere of radius r is $3\pi r^2$.

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).

(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).

(c) Assertion (A) is true, but Reason (R) is false. <<

(d) Assertion (A) is false, but Reason (R) is true.

Explanation:

A is true (joining two hemispheres along bases gives a sphere).

R is false (TSA of sphere = $4\pi r^2$, not $3\pi r^2$).

Answer is (C).

Section B

Very Short Answer Questions (2 marks each)

Q.21 [2 marks]

If x cos 60° + y cos 0° + sin 30° − cot 45° = 5, then find the value of x + 2y.

Answer: 11

Explanation:

cos 60° = 1/2, cos 0° = 1, sin 30° = 1/2, cot 45° = 1.

So x/2 + y + 1/2 − 1 = 5 → x/2 + y = 5 + 1/2 = 11/2.

Multiplying both sides by 2: x + 2y = 11.

OR

Q.21 [2 marks]

Evaluate: $\tan^2 60° / (\sin^2 60° + \cos^2 30°)$.

Answer: 2

Explanation:

$\tan^2 60° = 3$.

$\sin^2 60° = 3/4$.

$\cos^2 30° = 3/4$.

Expression = 3/(3/4 + 3/4) = 3/(3/2) = 2.

Q.22 [2 marks]

Find the zeroes of the polynomial $p(x) = x^2 + (4/3)x − 4/3$.

Answer: 2/3 and −2

Explanation:

Multiplying by 3: $3x^2 + 4x − 4 = 0$.

Factoring: (3x − 2)(x + 2) = 0.

x = 2/3 or x = −2.

Q.23 [2 marks]

The coordinates of the centre of a circle are (2a, a − 7). If the circle passes through the point (11, −9) and has diameter $10\sqrt{2}$ units, find the value(s) of 'a'.

Answer: 3 or 5

Explanation:

Radius = $5\sqrt{2}$.

Distance from $(2a, a-7)$ to $(11, -9)$ = $5\sqrt{2}$.

$(11-2a)^2 + (-9-a+7)^2 = 50 \rightarrow$

$(11-2a)^2 + (a+2)^2 = 50 \rightarrow$

$5a^2 - 40a + 75 = 0 \rightarrow$

$a^2 - 8a + 15 = 0 \rightarrow$

$(a-3)(a-5) = 0$.

$a = 3$ or 5.

Q.24 [2 marks]

If $\triangle ABC \sim \triangle PQR$ in which AB = 6 cm, BC = 4 cm, AC = 8 cm and PR = 6 cm, then find the length of (PQ + QR).

Answer: 7.5 cm

Explanation:

$\triangle ABC \sim \triangle PQR$: $AB/PQ = BC/QR = AC/PR$.

Ratio = $AC/PR = 8/6 = 4/3$.

$PQ = AB \times 3/4 = 6 \times 3/4 = 4.5$ cm.

$QR = BC \times 3/4 = 4 \times 3/4 = 3$ cm.

PQ + QR = 7.5 cm.

OR

Q.24 [2 marks]

In the given figure, $QR/QS = QT/PR$ and $\angle 1 = \angle 2$, show that $\triangle PQS \sim \triangle TQR$.

Answer: Proof based

Explanation:

$\angle 1 = \angle 2 \rightarrow PQ = PR$ (sides opposite equal angles).

$QR/QS = QT/PR = QT/PQ$.

In $\triangle PQS$ and $\triangle TQR$: $QR/QS = QT/PQ$ and $\angle Q$ is common.

By SAS similarity, $\triangle PQS \sim \triangle TQR$.

Q.25 [2 marks]

A person is standing at P outside a circular ground at a distance of 26 m from the centre of the ground. He found that his distances from the points A and B on the ground are 10 m (PA and PB are tangents to the circle). Find the radius of the circular ground.

Answer: 24 m

Explanation:

OA ⊥ PA (radius ⊥ tangent).

In right △OAP: $OA^2 + PA^2 = OP^2 \rightarrow OA^2 + 100 = 676 \rightarrow OA^2 = 576 \rightarrow OA = 24$ m.

Q.26 [2 marks]

In the given figure, O is the centre of the circle and BCD is tangent to it at C. Prove that ∠BAC + ∠ACD = 90°.

Answer: Proof based

Explanation:

OC ⊥ BCD (radius ⊥ tangent) → ∠OCD = 90°.

∠ACD = ∠OCD − ∠OCA = 90° − ∠OCA.

In △OAC, OA = OC (radii) → ∠OAC = ∠OCA.

So ∠ACD = 90° − ∠OAC = 90° − ∠BAC.

Therefore ∠BAC + ∠ACD = 90°.

OR

Q.26 [2 marks]

Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

Answer: Proof based

Explanation:

Let ABCD be a quadrilateral circumscribing a circle with centre O.

Join O to the tangent points.

This forms 4 pairs of congruent triangles from the centre.

The angles subtended by opposite sides AB and CD at the centre add up to 180° (supplementary) since the total angle around O is 360° and opposite pairs share this equally.

Section C

Short Answer Questions (3 marks each)

Q.27 [3 marks]

Prove that: $\tan\theta/(1-\cot\theta) + \cot\theta/(1-\tan\theta) = 1 + \sec\theta\,\text{cosec}\,\theta$.

Answer: Proof based

Explanation:

LHS = $\tan\theta/(1-\cot\theta) + \cot\theta/(1-\tan\theta)$.

Substituting $\sin\theta/\cos\theta$ and $\cos\theta/\sin\theta$, simplify to get $\sin^2\theta/[\cos\theta(\sin\theta-\cos\theta)] + \cos^2\theta/[\sin\theta(\cos\theta-\sin\theta)]$.

$= [\sin^3\theta - \cos^3\theta]/[\sin\theta\cos\theta(\sin\theta-\cos\theta)]$.

$= (\sin^2\theta + \sin\theta\cos\theta + \cos^2\theta)/(\sin\theta\cos\theta) = 1/(\sin\theta\cos\theta) + 1 = 1 + \sec\theta\,\text{cosec}\,\theta$ = RHS.

OR

Q.27 [3 marks]

Prove that: $(\sin A + \cos A)/(\sin A - \cos A) + (\sin A - \cos A)/(\sin A + \cos A) = 2/(2\sin^2 A - 1)$.

Answer: Proof based

Explanation:

LHS = $[(\sin A + \cos A)^2 + (\sin A - \cos A)^2]/[(\sin A - \cos A)(\sin A + \cos A)]$.

Numerator = $\sin^2 A + 2\sin A\cos A + \cos^2 A + \sin^2 A - 2\sin A\cos A + \cos^2 A = 2$.

Denominator = $\sin^2 A - \cos^2 A = \sin^2 A - (1 - \sin^2 A) = 2\sin^2 A - 1$.

So LHS = $2/(2\sin^2 A - 1)$ = RHS.

Q.28 [3 marks]

Find the ratio in which the y-axis divides the line segment joining the points (5, −6) and (−1, −4). Also find the point of intersection.

Answer: 5:1; point of intersection (0, −13/3)

Explanation:

Let the ratio be k:1.

x-coordinate: $(k(-1) + 5)/(k+1) = 0 \rightarrow -k + 5 = 0 \rightarrow k = 5$.

Ratio = 5:1.

y-coordinate: $(5(-4) + (-6))/(5+1) = (-20-6)/6 = -26/6 = -13/3$.

Point = (0, −13/3).

Q.29 [3 marks]

Prove that $1/\sqrt{5}$ is an irrational number.

Answer: Proof based

Explanation:

Assume $1/\sqrt{5}$ is rational, i.e., $1/\sqrt{5} = p/q$ (where p, q are coprime integers, $q \neq 0$).

Then $\sqrt{5} = q/p \rightarrow \sqrt{5}$ is rational.

But it is known that $\sqrt{5}$ is irrational — this is a contradiction.

Therefore $1/\sqrt{5}$ is irrational.

Q.30 [3 marks]

A room is in the form of a cylinder surmounted by a hemispherical dome. The base radius of the hemisphere is half of the height of the cylindrical part. If the room contains 1408/21 m³ of air, find the height of the cylindrical part. (Use π = 22/7).

Answer: 4 m

Explanation:

Let the height of the cylinder = h, radius = h/2.

Volume $= \pi r^2 h + (2/3)\pi r^3 = \pi(h/2)^2 h + (2/3)\pi(h/2)^3 = \pi h^3/4 + \pi h^3/12 = \pi h^3(3+1)/12 = \pi h^3/3$.

$\pi h^3/3 = 1408/21 \rightarrow (22/7)h^3/3 = 1408/21 \rightarrow 22h^3/21 = 1408/21 \rightarrow h^3 = 64 \rightarrow h = 4$ m.

Q.31 [3 marks]

Two dice are thrown at the same time. Determine the probability that the

difference of the numbers on the two dice is 2.

Answer: 2/9

Explanation:

Total outcomes = 36.

$|d_1-d_2|$ = 2: (1,3),(3,1),(2,4),(4,2),(3,5),(5,3),(4,6),(6,4) = 8 outcomes.

P = 8/36 = 2/9.

Q.32 [3 marks]

Vijay invested certain amounts of money in two schemes A and B, which offer interest at the rate of 8% per annum and 9% per annum, respectively. He received Rs.1,860 as the total annual interest. However, had he interchanged the amounts of investments in the two schemes, he would have received Rs.20 more as annual interest. How much money did he invest in each scheme?

Answer: Scheme A: 12,000 and Scheme B: 10,000

Explanation:

Let x be invested in A, y in B.

0.08x + 0.09y = 1860 ...(1).

0.09x + 0.08y = 1880 ...(2).

Adding: 0.17(x+y) = 3740 → x+y = 22000.

Subtracting (1) from (2): 0.01(x−y) = 20 → x−y = 2000.

Solving: x = 12000, y = 10000.

Section D

Long Answer Questions (5 marks each)

Q.33 [5 marks]

The diagonal BD of a parallelogram ABCD intersects the line segment AE at the point F, where E is any point on the side BC. Prove that DF × EF = FB × FA.

Answer: Proof based

Explanation:

In △AFB and △DFE: ∠AFB = ∠DFE (vertically opposite angles).

∠ABF = ∠FDE (alternate angles, AB ∥ DC).

By AA similarity, △AFB ~ △DFE.

Therefore AF/DF = BF/EF → DF × EF = FB × FA.

OR

Q.33 [5 marks]

In △ABC, if AD ⊥ BC and $AD^2 = BD \times DC$, then prove that ∠BAC = 90°.

Answer: Proof based

Explanation:

In △ABD: $AB^2 = AD^2 + BD^2 = BD \times DC + BD^2 = BD(DC + BD) = BD \times BC$.

In △ACD: $AC^2 = AD^2 + DC^2 = BD \times DC + DC^2 = DC(BD + DC) = DC \times BC$.

$AB^2 + AC^2 = BD \times BC + DC \times BC = BC(BD + DC) = BC^2$.

By the converse of Pythagoras theorem, ∠BAC = 90°.

Q.34 [5 marks]

The perimeter of a right triangle is 60 cm and its hypotenuse is 25 cm. Find the lengths of the other two sides of the triangle.

Answer: 15 cm and 20 cm

Explanation:

$a + b = 60 - 25 = 35$.

$a^2 + b^2 = 625$.

$(a+b)^2 = a^2 + 2ab + b^2 \rightarrow 1225 = 625 + 2ab \rightarrow ab = 300$.

$t^2 - 35t + 300 = 0 \rightarrow (t-15)(t-20) = 0$.

Sides are 15 cm and 20 cm.

OR

Q.34 [5 marks]

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.

Answer: 40 km/h

Explanation:

480/(s−8) − 480/s = 3 →

480×8/[s(s−8)] = 3 →

$s^2 - 8s - 1280 = 0$ →

(s−40)(s+32) = 0 →

s = 40 km/h (since speed cannot be negative).

Q.35 [5 marks]

Find the missing frequency 'f' in the following table, if the mean of the given data is 18. Hence find the mode of the data.

Daily Allowance | Number of Children

11–13 | 7

13–15 | 6

15–17 | 9

17–19 | 13

19–21 | f

21–23 | 5

23–25 | 4

Answer: f = 20, Mode = 19.64 (approx)

Explanation:

Class marks: 12,14,16,18,20,22,24.

Σfi = 44+f.

Σfixi = 84+84+144+234+20f+110+96 = 752+20f.

Mean = (752+20f)/(44+f) = 18 → 752+20f = 792+18f → 2f = 40 → f = 20.

Modal class = 19−21 (f=20).

Mode = 19 + [(20−13)/(2×20−13−5)]×2 = 19 + 14/22 = 19 + 0.636 = 19.64.

Q.36(a) [5 marks]

A school is organizing a charity run to raise funds for a local hospital. The

run is planned as a series of rounds around a track, with each round being 300 metres. To make the event more challenging and engaging, the organizers decide to increase the distance of each subsequent round by 50 metres. For example, the second round will be 350 metres, the third round will be 400 metres and so on. The total number of rounds planned is 10.

Write the fourth, fifth and sixth term of the Arithmetic Progression so formed.

Answer: 450, 500, 550

Explanation:

First term a = 300, common difference d = 50.

Fourth term $a_4 = 300 + 3(50) = 450$ m.

Fifth term $a_5 = 300 + 4(50) = 500$ m.

Sixth term $a_6 = 300 + 5(50) = 550$ m.

Q.36(b) [5 marks]

Determine the distance of the 8th round.

Answer: 650

Explanation:

Eighth term $a_8 = 300 + 7(50) = 650$ metres.

Q.36(c) [5 marks]

Find the total distance run after completing all 10 rounds.

Answer: 5250

Explanation:

$S_{10} = (10/2)[2(300) + 9(50)] = 5[600 + 450] = 5 \times 1050 = 5250$ metres.

OR

Q.36(c) [5 marks]

If a runner completes only the first 6 rounds, what is the total distance run by the runner?

Answer: 2550

Explanation:

$S_6 = (6/2)[2(300) + 5(50)] = 3[600 + 250] = 3 \times 850 = 2550$ metres.

Q.37(a) [4 marks]

A brooch is a decorative piece often worn on clothing like jackets, blouses or dresses to add elegance. Made from precious metals and decorated with gemstones, brooches come in many shapes and designs.

One such brooch is made with silver wire in the form of a circle with diameter 35 mm. The wire is also used in making 5 diameters which divide the circle into 10 equal sectors as shown in the figure.

Find the central angle of each sector.

Answer: 36°

Explanation:

10 equal sectors divide 360° equally. Each central angle = 360°/10 = 36°.

Q.37(b) [4 marks]

Find the length of the arc ACB.

Answer: 11 mm

Explanation:

Arc ACB is the arc of one sector (C lies between A and B), so it subtends 36°.

Arc length = $(36/360) \times \pi \times 35 = (1/10) \times (22/7) \times 35 = 11$ mm.

Q.37(c) [4 marks]

Find the area of each sector of the brooch.

Answer: 96.25 mm²

Explanation:

Radius = 17.5 mm.

Area = (36/360) × (22/7) × 17.5² = (1/10) × (22/7) × 306.25 = 96.25 mm².

OR

Q.37(c) [4 marks]

Find the total length of the silver wire used.

Answer: 285 mm

Explanation:

Circumference = (22/7) × 35 = 110 mm.

5 diameters = 5 × 35 = 175 mm.

Total = 110 + 175 = 285 mm.

Q.38(a) [4 marks]

Amrita stood near the base of a lighthouse, gazing up at its towering height. She measured the angle of elevation to the top and found it to be 60°. Then, she climbed a nearby observation deck, 40 metres higher than her original position and noticed the angle of elevation to the top of lighthouse to be 45°.

If CD is h metres, find the distance BD in terms of 'h'.

Answer: h

Explanation:

In right triangle BDC: tan 45° = CD/BD = h/BD → BD = h.

Q.38(b) [4 marks]

Find distance BC in terms of 'h'.

Answer: h√2

Explanation:

In right triangle BDC: BC² = BD² + CD² = h² + h² = 2h². BC = h√2.

Q.38(c) [4 marks]

Find the height CE of the lighthouse. [Use √3 = 1.73]

Answer: 94.64 m

Explanation:

AE = BD = h (horizontal distances are equal).

CE = CD + DE = h + 40.

From A: tan 60° = CE/AE →

√3 = (h+40)/h →

√3h = h + 40 →

h(√3−1) = 40 →

h = 40/(√3−1) = 40(√3+1)/2 = 20(2.73) = 54.64 m.

CE = 54.64 + 40 = 94.64 m.

OR

Q.38(c) [4 marks]

If AC = 100 m, find distance AE.

Answer: 50 m

Explanation:

In right triangle AEC: cos 60° = AE/AC → 1/2 = AE/100 → AE = 50 m.