Some Applications of Trigonometry Class 10 Important Questions

10 questions · 27 marks · no calculator · step-marked answers

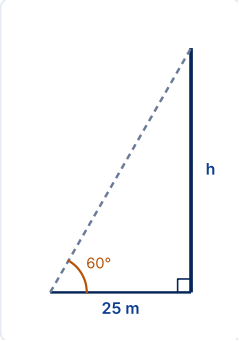
Name _____ Date _____ Score / 27

- Original questions in the board paper's question types, from 1-mark MCQs to a case study. Try every question before you look at the answers.
- No calculator: as in the CBSE board exam, everything works by hand.
- Worked answers with step marks for 5 questions start after the questions. The other 5 open free on the chapter page with a free account (no card): the link is next to each one.
- Online, with more practice: cbsemathrevision.com/class-10/some-applications-of-trigonometry

Section A · Multiple choice and assertion–reason (1 mark each)

1. **1 mark · Angle of elevation**

From a point on level ground 25 m from the foot of a vertical tower, the angle of elevation of its top is $60°$. The height of the tower is



Tower seen from 25 m at an angle of elevation of 60°

(a) 25 m

(b) $\frac{25}{\sqrt{3}}$ m

(c) $25\sqrt{3}$ m

(d) 50 m

2. **1 mark · Angle of elevation**

A pole's shadow on level ground is only $\frac{1}{\sqrt{3}}$ of the pole's own height. At that moment the sun's angle of elevation is

(a) $30°$

(b) $45°$

(c) $60°$

(d) $90°$

3. **1 mark · Angle of elevation**

In the following question, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

Assertion (A): As you walk in a straight line towards the foot of a tower, the angle of elevation of its top increases.

Reason (R): For angles between $0°$ and $90°$, $\tan\theta$ increases as θ increases.

(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).

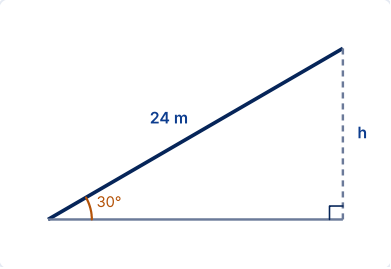
(c) Assertion (A) is true but Reason (R) is false.

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

Section B · Short answer (2 marks each)

4. **2 marks · Angle of elevation**

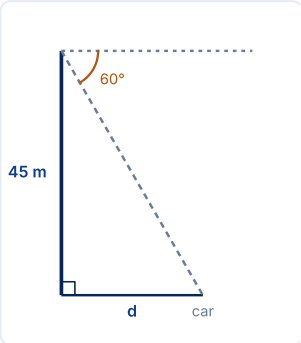
A straight escalator 24 m long rises at $30°$ to the horizontal. Through what vertical height does it carry a passenger?



Escalator 24 m long at 30° to the horizontal

5. **2 marks · Angle of depression**

From the top of a building 45 m high, the angle of depression of a car on the road is $60°$. How far is the car from the foot of the building?

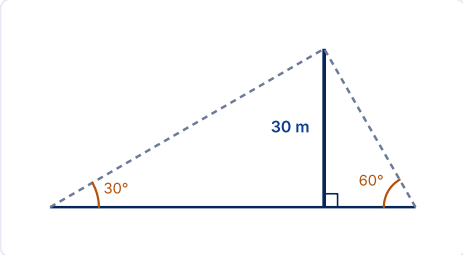


Angle of depression of 60° from the top of a 45 m building

Section C · Short answer (3 marks each)

6. **3 marks · Two-triangle problems**

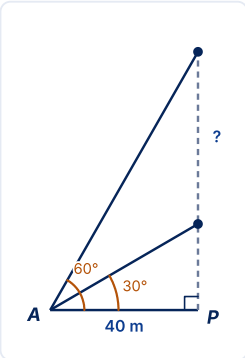
Two people stand on level ground on opposite sides of a vertical pole 30 m tall, in a straight line with its foot. The angles of elevation of the top of the pole from them are $30°$ and $60°$. Find the distance between them.



Pole 30 m tall: angles of elevation 30° and 60°

7. **3 marks · Angle of elevation**

A drone hovers directly above a point P on level ground. From a point A on the ground 40 m from P, the angle of elevation of the drone is $30°$. The drone then rises vertically until its angle of elevation from A is $60°$. How far does it rise?

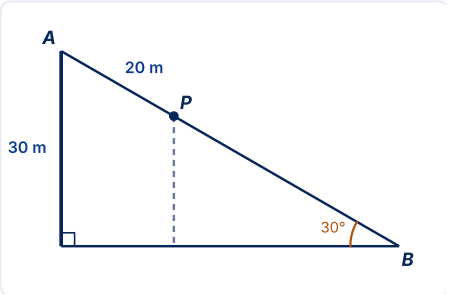


From A, 40 m from P: elevation 30°, then 60°

Section D · Long answer (5 marks each)

8. **5 marks · Angle of depression**

A straight zip-line runs from the top A of a vertical tower 30 m high down to a point B on level ground, making an angle of 30° with the ground. (a) Find the length of the zip-line and the distance of B from the foot of the tower. (b) A rider stops at P on the line, 20 m from A. How high above the ground is the rider, and how far horizontally from the tower?



Zip-line from the top of a 30 m tower at 30° to the ground

9. **5 marks · Two-triangle problems**

A helicopter hovers at a point H vertically above a point O on level ground. From a point A on the ground the angle of elevation of H is 60°; from B, which is 80 m farther from O along the line OA, it is 30°. Find the height of the helicopter and the distance OA. (Use $\sqrt{3} = 1.73$ for the height in metres.)

Section E · Case study (4 marks)

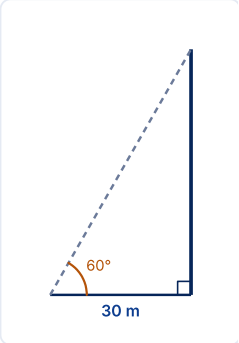
10. **4 marks · Angle of elevation**

Mobile tower. A student stands on level ground 30 m from the foot of a vertical mobile tower and sees its top at an angle of elevation of $60°$.

i. Find the height of the tower. *[1 mark]*

ii. Find the distance from the student to the top of the tower. *[1 mark]*

iii. How far back, along the same line, must the student walk for the angle of elevation to become $30°$? *[2 marks]*



Student 30 m from the tower, angle of elevation 60°

Answers and worked solutions

Question 1 — 1 mark

$\tan 60^\circ = \dfrac{h}{25} \Rightarrow h = 25\sqrt{3}\ m$ **A1**

Correct option: (c) $25\sqrt{3}\ m$

Question 2 — 1 mark

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/some-applications-of-trigonometry#iq-2

Question 3 — 1 mark

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/some-applications-of-trigonometry#iq-3

Question 4 — 2 marks

Answer: $12\ m$

$\sin 30^\circ = \dfrac{h}{24}$ **M1**

$h = 24 \times \dfrac{1}{2} = 12\ m$ **A1**

Question 5 — 2 marks

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/some-applications-of-trigonometry#iq-5

Question 6 — 3 marks

Answer: $40\sqrt{3}\ m$

$\tan 30^\circ = \dfrac{30}{d_1} \Rightarrow d_1 = 30\sqrt{3}\ m$ **M1**

$\tan 60^\circ = \dfrac{30}{d_2} \Rightarrow d_2 = \dfrac{30}{\sqrt{3}} = 10\sqrt{3}\ m$ **A1**

Distance $= 30\sqrt{3} + 10\sqrt{3} = 40\sqrt{3}\ m$ **A1**

Question 7 — 3 marks

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/some-applications-of-trigonometr

Question 8 — 5 marks

Answer: $60\ m$, $30\sqrt{3}\ m$; $20\ m$ high, $10\sqrt{3}\ m$ from the tower

(a) $\sin 30^\circ = \dfrac{30}{AB} \Rightarrow AB = 60\ m$ **M1**

Distance of B from the foot $= 30\sqrt{3}\ m$ (from $\tan 30^\circ = \dfrac{30}{d}$) **A1**

(b) Along the line the rider has dropped

$20 \sin 30^\circ = 10\ m$ **M1**

Height above the ground $= 30 - 10 = 20\ m$ **A1**

Horizontal distance from the tower

$= 20 \cos 30^\circ = 10\sqrt{3}\ m$ **A1**

Question 9 — 5 marks

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/some-applications-of-trigonometr

Question 10 — 4 marks

i. $h = 30 \tan 60^\circ = 30\sqrt{3}\ m$ **A1**

ii. $\cos 60^\circ = \dfrac{30}{\ell} \Rightarrow \ell = 60\ m$ **A1**

iii. New distance

$d = \dfrac{30\sqrt{3}}{\tan 30^\circ} = 30\sqrt{3} \times \sqrt{3} = 90\ m$ **M1**

Walk back $90 - 30 = 60\ m$ **A1**

More on this chapter, free: revision notes, a Route to 95 and practice with instant feedback at cbsemathrevision.com/class-10/some-applications-of-trigonometry

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