27. At a point on level ground, the angle of elevation of a vertical tower is found to be such that its tangent is 5/12. On walking 192 metres towards the tower the tangent of the angle of elevation is 3/4. Find the height of the tower :

(A) 160 m (B) 180 m

(C) 240 m (D) 260 m

28. From a cliff 150 m. above shore line the angle of depression of a ship is 30°. Find the distance from the ship to a point on the shore directly below the observer :

(A) $\frac{150}{\sqrt{3}}$ (B) $150\sqrt{3}$

(C) 150 (D) $150\sqrt{\frac{2}{3}}$

29. From the top of a 7m. high building, the angle of elevation of the top of a TV tower is 60° and the angle of depression of its foot is 45°. Find the height of TV tower :

(A) $7(1+\sqrt{3})$ (B) $7(\sqrt{3}-1)$

(C) $7\sqrt{3}+1$ (D) $3(\sqrt{7}+1)$

30. A pole of height h = 20 ft has a shadow of length l = 11.55 ft at a particular instant of time. Find the angle of elevation (in degrees) of the sun at this point of time.

(A) 30° (B) 60°

(C) 90° (D) None of these

31. The angle of elevation of a ladder leaning against a house is 60° and the foot of the ladder is 6.5 metres from the house. The length of the ladder is

(A) 15 metres (B) 3.25 metres

(C) $\frac{13}{\sqrt{3}}$ metres (D) 13 metres

32. A kite is flying at a height of 75 m from the level ground, attached to a string inclined at 60° to the horizontal. The length of the string is

(A) $50\sqrt{3}$ m (B) $\frac{50}{\sqrt{3}}$ m

(C) $50\sqrt{2}$ m (D) $\frac{50}{\sqrt{2}}$ m

33. Two poles of equal height are on either side of a 50 m broad road. From a point on the road the angles of elevation of their tops are 45° and 60° respectively. What is the height of each pole?

(A) 30 m (B) 35 m

(C) $\frac{35\sqrt{3}\text{ m}}{(1+\sqrt{3})}$ (D) $\frac{50\sqrt{3}}{(1+\sqrt{3})}$ m

34. The heights of two poles are 180 m and 60 m respectively. If the angle of elevation of the top of the first pole from the foot of the second is 60°, what is the angle of elevation of the top of the second pole from the foot of the first ?

(A) 30° (B) 60°

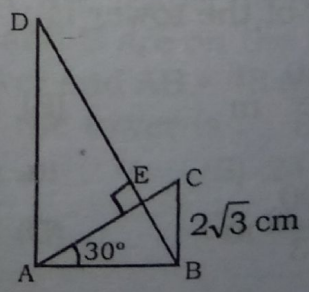
(C) 45° (D) $22\frac{1}{2}°$

35. If the shadow of a tree of 60 m height is 18m, then the height of the tree whose shadow is 24 m at the same time of the day is

(A) 60 m (B) 70 m

(C) 80 m (D) 90 m

36. In the figure given below, ABC is right angled at B and ΔABD is right angled at A. If BD is perpendicular to AC and BC = $2\sqrt{3}$ cm with $\angle CAB = 30°$, then the length of AD is



(A) $5\sqrt{3}$ cm (B) $4\sqrt{3}$ cm

(C) $7\sqrt{3}$ cm (D) $6\sqrt{3}$ cm

37. The angle of elevation of the top of a hill at the foot of a tower is 45° and the angle of elevation of the top of the tower at the foot of the hill is 30°. If the tower is 100m tall, the height of the hill is-

(A) $50\sqrt{3}$ m (B) 75 m

(C) 86 m (D) $100\sqrt{3}$ m

38. A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground by making an angle of 60° with it. The distance between the foot of the tree and the point where the top touches the ground is 75cm. Find the height of the tree.

(A) $75\left(2+\sqrt{3}\right)$ (B) $75\left(\sqrt{3}+1\right)$

(C) $73\left(\sqrt{2}+1\right)$ (D) $74(\sqrt{3}+2)$

39. A ladder is placed in such a way that its foot is 30 m away from a wall and its top reaches a window 40 m above the ground. The length of the ladder is-

(A) 70 m (B) 10 m

(C) 50 m (D) 35 m

40. A flag of 3 metres high, placed on the top of a tower throws a shadow of $3\sqrt{3}$ metres along the ground, then the angle (in degrees) that the sun makes with the ground is-

(A) 30° (B) 45°

(C) 60° (D) 90°

41. From a cliff 120 m above the shore of a sea, the angle of depression of a ship is 60°. Find the distance from the ship to a point on the shore directly below the observer.

(A) $40\sqrt{2}$ m (B) $40\sqrt{3}$ m

(C) $33\sqrt{3}$ m (D) $50\sqrt{3}$ m

42. At a point on the ground, the angle of elevation of the top of a tower is found to be such that $\tan A = \frac{8}{15}$. On walking 117 meters towards the tower, the angle of elevation is found to be such that $\tan B = \frac{3}{4}$. The height of the tower is –

(A) 212 m (B) 226 m

(C) 216 m (D) 232 m

43. From a point on a bridge across a river, the angles of depression of the banks are 30° and 45°, respectively. If the bridge is at a height of 3 m above the bank, find the width of the river.

(A) $3(\sqrt{3}+1)$ m (B) $3(\sqrt{3}-1)$ m

(C) $(\sqrt{3}-1)$ m (D) $(\sqrt{3}+1)$ m

44. The shadow of a tower standing on a level plane is found to be 50 m longer when the sun's elevation is 30° than when it is 60°. Find the height of the tower ?

(A) 25 m (B) $25\sqrt{3}$ m

(C) $\frac{25}{\sqrt{3}}$ m (D) 50 m

45. The length of a shadow of a tree is 16 m, when the angle of elevation of the sun is 60°. Find the height of the tree ?

(A) 8 m (B) 16 m

(C) $16\sqrt{3}$ m (D) $\frac{16}{\sqrt{3}}$ m

46. A ladder leans against a vertical wall. The top of the ladder is 9 m above the ground. When the bottom of the ladder is moved 3 m farther away, then the top of ladder reaches along the foot of the wall. What is the length of the ladder ?

(A) 10 m (B) 14 m

(C) 12 m (D) 15 m

47. If the angle of elevation of the sun changes from 30° to 60°, then the length of the shadow of a pillar decreases by 24 m. The height of the pillar is –

(A) $10\sqrt{3}$ m (B) $8\sqrt{3}$ m

(C) $12\sqrt{3}$ m (D) $16\sqrt{3}$ m

48. The horizontal distance between the two towers is 60 m. The angle of depression of top of the first tower when seen from the top of the second tower is 45°. If the height of the second tower is 130 m, then find the height of the first tower.

(A) 60 m (B) 65 m

(C) 70 m (D) 75 m

49. The angle of elevation of the top of a building from the top and the bottom of tree are 45° and 60° respectively. If 30 m is the height of the tree, then find the height of the building ?

(A) $15\sqrt{3}\ (\sqrt{3}+1)$ m

(B) $10\sqrt{3}\ (2+\sqrt{3})$ m

(C) $15\left(\sqrt{3}+1\right)$ m

(D) $15\sqrt{3}\left(\sqrt{3}-1\right)$ m

50. From an aeroplane vertically above a straight road the angle of depressions of two consecutive kilometre stones on the same side are 30° and 45°. Then at what height the aeroplane is flying ?

(A) 2.22 km (B) 2.27 km

(C) 2.365 km (D) 1.365 km

51. The angle of elevation of the top a tower from the base of a building is 30° and the angle of elevation of the top of the building from the base of the tower is 60°. If the height of the building is 125 m, find the height of the tower.

(A) 37.66 m (B) 41.66 m

(C) 39.76 m (D) 42.66 m

52. From the top of a light-house at a height 20 metres above sea-level, the angle of depression of a ship is 30°. The distance of the ship from the foot of the light-house is

(A) 20 m (B) $20\sqrt{3}$ m

(C) 30 m (D) $30\sqrt{3}$ m

53. From the top of a tower 180 m high, it was observed that the angle of depression of a cat sitting on the ground was 30°. Find the distance of the cat from the foot of the tower.

(A) 180 m (B) $180\sqrt{3}$ m

(C) 170 m (D) $170\sqrt{3}$ m

54. The elevation of a pole from a place is 30°. After moving towards the pole by 12 metres, the elevationbecomes 45°. The height of the pole is

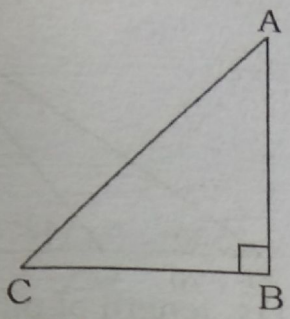
(A) 16.4 metres (B) 16.8 metres

(C) 14.5 metres (D) 15.8 metres

Answer-key

1.(D)	2. (C)	3. (C)	4.(C)	5. (A)	6.(C)	7. (D)	8. (B)	9. (C)	10.(B)
11.(A)	12.(C)	13.(C)	14.(D)	15.(C)	16.(B)	17.(C)	18.(B)	19.(B)	20.(A)
21.(A)	22.(B)	23.(B)	24.(C)	25.(B)	26.(B)	27.(B)	28.(B)	29.(A)	30.(B)
31.(D)	32.(A)	33.(D)	34.(A)	35.(C)	36.(D)	37.(D)	38.(A)	39.(C)	40.(A)
41.(B)	42.(C)	43.(A)	44.(B)	45.(C)	46.(D)	47.(C)	48.(C)	49.(A)	50.(D)
51.(B)	52.(B)	53.(B)	54.(A)						

1. (D)



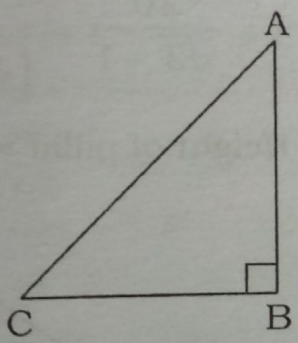
Length of pillar = AB
Length of shadow = BC

$$AB = BC$$

$$\frac{AB}{BC} = 1 = \tan 45°$$

So, angle of elevation = $45° = \frac{\pi}{4}$

2. (C)



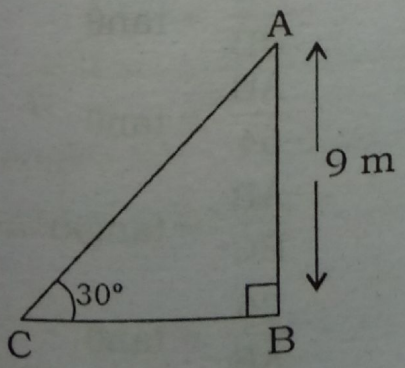
Length of tower = AB
Length of shadow = BC

$$\frac{1}{\sqrt{3}} AB = BC$$

$$\frac{AB}{BC} = \sqrt{3} = \tan 60°$$

So, angle of elevation of sun = 60°

3. (C)



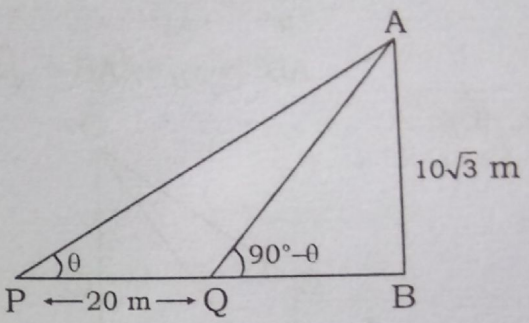
Length of pole = 9 m
Angle of elevation = 30°
A.T.Q.,

$$\frac{AB}{BC} = \tan(\angle ACB)$$

$$BC = \frac{9}{\tan 30°}$$

$$= 9\sqrt{3} \text{ m}$$

4. (C)



Length of building = $10\sqrt{3}$ m
A.T.Q.,

$$BP - BQ = 20$$

$$AB \cot\theta - AB \cot(90° - \theta) = 20$$

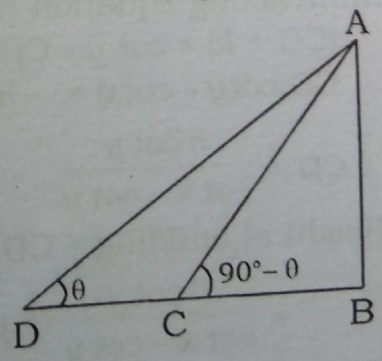
$$10\sqrt{3}(\cot\theta - \tan\theta) = 20$$

$$\cot\theta - \frac{1}{\cot\theta} = \frac{2}{\sqrt{3}} = \sqrt{3} - \frac{1}{\sqrt{3}}$$

$$\cot\theta = \sqrt{3}$$

Distance of point P from building
$= AB \cot\theta$
$= (10\sqrt{3})(\sqrt{3})$
$= 30$ m

5. (A)



Length of BC = x m

Length of BD = y m

A.T.Q.,

$$\frac{AB}{BD} = \tan\theta$$

$$\frac{AB}{y} = \tan\theta \quad \ldots(i)$$

$$\frac{AB}{BC} = \tan(90° - \theta)$$

$$AB = x\cot\theta$$

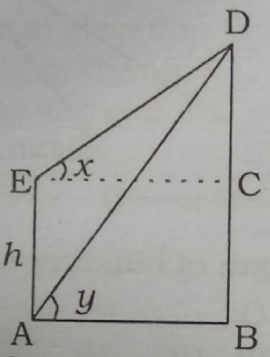
$$\tan\theta = \frac{x}{AB} \quad \ldots(ii)$$

By equation *(i)* and *(ii)*

$$\frac{AB}{y} = \frac{x}{AB}$$

$$AB^2 = xy \Rightarrow AB = \sqrt{xy}$$

6. (C)



Height of tree (AE) = h m

A.T.Q.,

$$\frac{CD}{EC} = \tan x$$

$$EC = CD \times \cot x \quad \ldots(i)$$

$$\frac{BD}{AB} = \tan y$$

$$AB = BD \times \cot y \quad \ldots(ii)$$

But $AB = EC$

$\Rightarrow$ $EC = (CD + h) \times \cot y$

Subtracting equation (i) from (ii)

$(CD + h) \times \cot y - CD \times \cot x = 0$

$CD(\cot y - \cot x) = -h\cot y$

$$CD = \frac{h\cot y}{\cot x - \cot y}$$

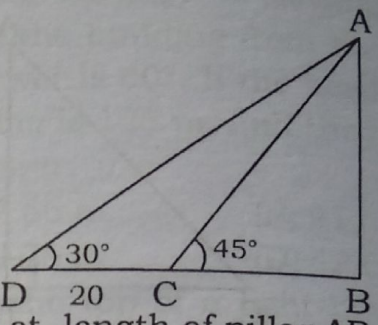
Height of building = CD + BC

$$= \frac{h\cot y}{\cot x - \cot y} + h$$

$$= \frac{h\cot y + h\cot x - h\cot y}{\cot x - \cot y}$$

$$= \frac{h\cot x}{\cot x - \cot y}$$

7. (D)



Let, length of pillar AB = x m

A.T.Q.,

BD = AB cot 30° = $\sqrt{3}x$ m

BC = AB cot 45° = x m

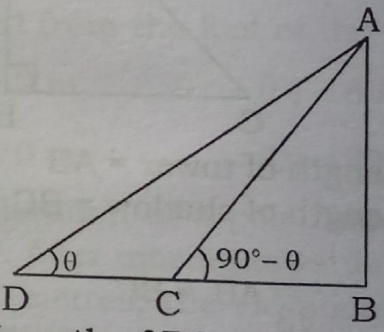
BD – BC = 20

$\sqrt{3}x - x = 20$

$$x = \frac{20}{\sqrt{3}-1} = \frac{20(\sqrt{3}+1)}{(\sqrt{3}-1)(\sqrt{3}+1)}$$

Height of pillar = $10(\sqrt{3}+1)$

8. (B)



Length of BC = 36 m

Length of BD = 64 m

A.T.Q.,

$$\frac{AB}{BD} = \tan\theta$$

$$\frac{AB}{64} = \tan\theta \quad \ldots(i)$$

$$\frac{AB}{BC} = \tan(90° - \theta)$$

$$\frac{36}{AB} = \tan\theta \quad \ldots(ii)$$

From equation *(i)* and *(ii)*

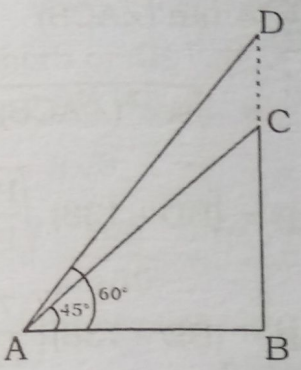
$$\frac{AB}{64} = \frac{36}{AB}$$

$$AB^2 = 36 \times 64 = 2304 = (48)^2$$

$$AB = 48$$

Height of tower = 48 m

9. (C)



Distance of point A from base of pillar = 100 m

A.T.Q.,

$$\frac{BC}{AB} = \tan 45°$$

$$BC = 100 \times 1 = 100$$

Length of incomplete pillar = 100 m

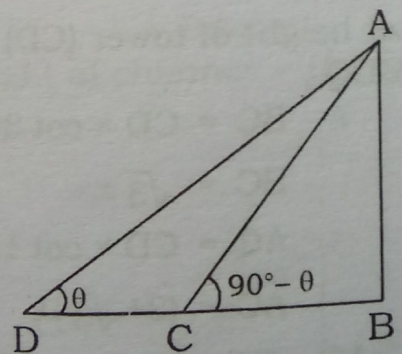
$$\frac{BD}{AB} = \tan 60°$$

$$BD = 100 \times \sqrt{3} = 100\sqrt{3}$$

Length of complete pillar is to be increased by $= (100\sqrt{3} - 100)$ m

$$= 100(\sqrt{3} - 1) \text{ m}$$

10. (B)



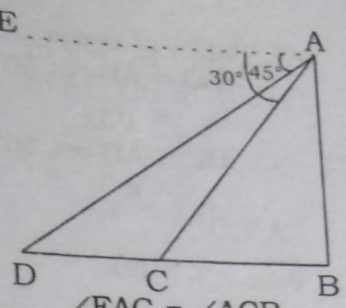
If angles are complementary then

height of tower AB $= \sqrt{BC \times BD}$

$$= \sqrt{9 \times 16}$$

$$= 12 \text{ m}$$

11. (A)



$\angle EAC = \angle ACB$

and $\angle EAD = \angle ADB$

Let, height of light house = x m

$BC = AB \cot 45°$

$BC = x$ m

$BD = AB \cot 30°$

$= \sqrt{3}\, x$

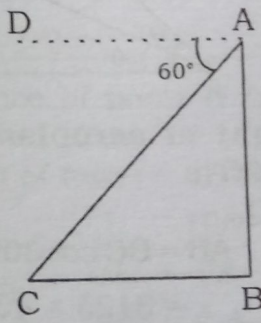
A.T.Q.,

$$\sqrt{3}\, x - x = 6$$

$$x = \frac{6}{\sqrt{3} - 1} = \frac{6(\sqrt{3} + 1)}{3 - 1}$$

$$x = 3(\sqrt{3} + 1)$$

12. (C)



$\angle ACB = \angle DAC = 60°$

Height of tower = 180m

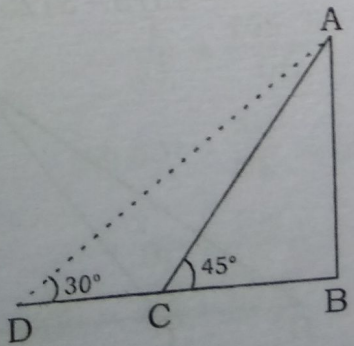
Distance of boat from base of tower

$= AB \cot 60°$

$$= 180 \times \frac{1}{\sqrt{3}}$$

$$= 60\sqrt{3} \text{ m}$$

13. (C)



Let height of tower (AB) = x m

$BD = AB \cot 30°$

$= \sqrt{3}x$

$BC = AB \cot 45°$

$= x$

A.T.Q.,

$\sqrt{3}x - x = 60$

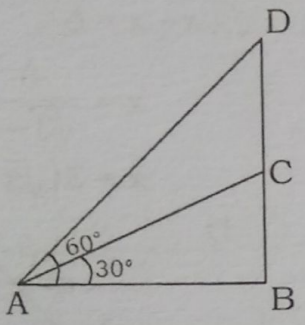
$x = \dfrac{60}{\sqrt{3}-1}$

$= \dfrac{60(\sqrt{3}+1)}{3-1}$

$= 30(\sqrt{3}+1)$

Height of tower = $30(\sqrt{3}+1)$ m

14. (D)



Height of aeroplane at C (BC) = 3125 m

A.T.Q.,

$AB = BC \cot 30°$

$= 3125 \times \sqrt{3}$

Distance of aeroplane C = $3125\sqrt{3}$

$BD = AB \tan 60°$

$= 3125\sqrt{3} \times \sqrt{3}$

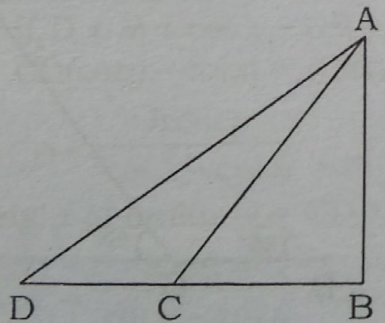
$= 9375$ m

Height of aeroplane at D = 9375 m

Distance between both aeroplanes

$= 9375 - 3125 = 6250$ m

15. (C)



Let height the monument = x m

A.T.Q.,

$\dfrac{AB}{BD} = \tan(\angle ADB) = \dfrac{1}{5}$

$5AB = BD$ ...(i)

$\dfrac{AB}{BC} = \tan(\angle ACB)$

$= \sqrt{\sec^2(\angle ACB) - 1}$

$AB = (BD - 138)\sqrt{\dfrac{193}{144} - 1}$

$AB = (BD - 138)\left(\dfrac{7}{12}\right)$ ...(ii)

Putting the value of BD in equation (ii)

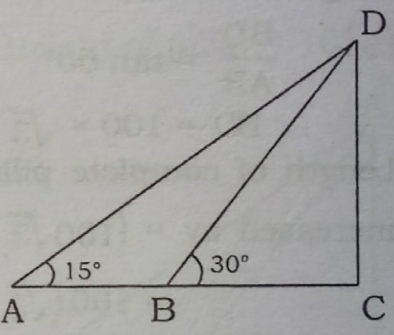
$12\,AB = (5AB - 138) \times 7$

$12\,AB = 35\,AB - 138 \times 7$

$23\,AB = 138 \times 7$

$AB = 42$ m

16. (B)



Let height of tower (CD) = x m

A.T.Q.,

$BC = CD \times \cot 30°$

$BC = \sqrt{3}\,x$ ...(i)

$AC = CD \times \cot 15°$

$AC = (2+\sqrt{3})x$

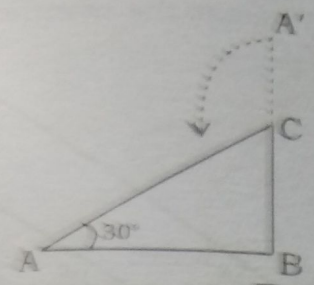
$AC - BC = 48$

$(2+\sqrt{3})x - \sqrt{3}x = 48$

$2x = 48$

$x = 24$ m

17.(C)



Length of AB = $8\sqrt{3}$ m

BC = AB tan 30°

$= 8\sqrt{3} \times \frac{1}{\sqrt{3}} = 8$ m

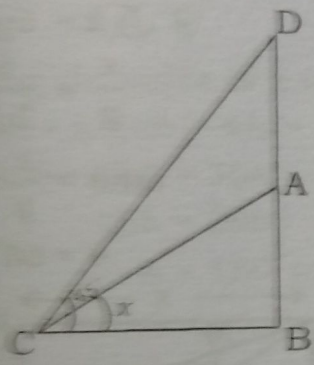
$AC = \frac{BC}{\sin 30°} = \frac{8 \times 2}{1} = 16$m

So, Height of post = BC + AC

= (8 + 16)m

= 24 m

18.(B)



Height of building = h m

A.T.Q.,

BC = AB × cot $x°$

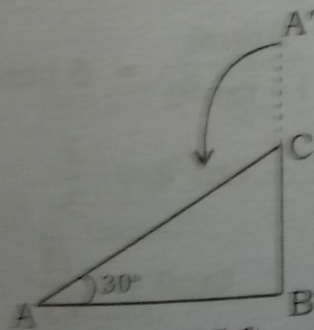
= h cot x

BD = BC × tan 45°

= h cot x

Height of chimney = (h cot $x - h$)m

19.(B)



Height of post = 15 ft

Let height at which it broken = x ft

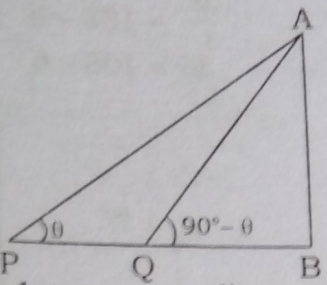
A.T.Q.,

$\frac{BC}{AC} = \sin 30°$

$\frac{x}{15 - x} = \frac{1}{2} \Rightarrow 2x = 15 - x$

$x = 5$ ft

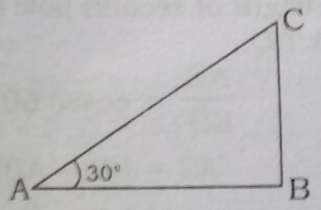
20.(A)



If angles are complimentary then height of tower (AB) = $\sqrt{PB \times QB}$

= $\sqrt{ab}$ m

21.(A)

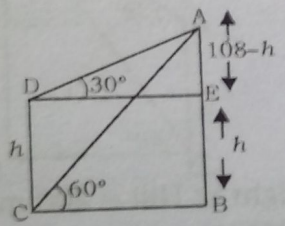


Distance of point A from base of tower = 100 m

Height of tower = AB tan 30°

$= 100 \times \frac{1}{\sqrt{3}} = \frac{100}{\sqrt{3}}$ m

22.(B)



$\tan 30° = \frac{AE}{DE}$

$\Rightarrow \frac{1}{\sqrt{3}} = \frac{108 - h}{DE}$ ...(i)

$\tan 60° = \frac{AB}{DE} \Rightarrow \sqrt{3} = \frac{108}{BC}$

$\Rightarrow BC = \frac{108}{\sqrt{3}}$

But DE = BC,

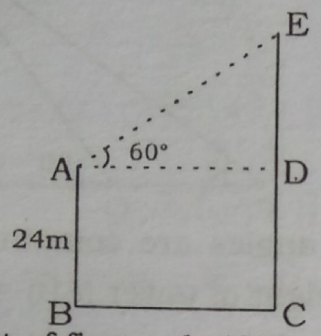
$\Rightarrow \quad DE = \frac{108}{\sqrt{3}}$ Put in *(i)*

$$\frac{1}{\sqrt{3}} = \frac{108-h}{\frac{108}{\sqrt{3}}}$$

$$\Rightarrow \quad \frac{108}{3} = 108 - h$$

$$\Rightarrow \quad 36 = 108 - h \quad \Rightarrow \quad h = 72 \text{ m}$$

23. (B)



Height of first pole (CE) = 36 m

Height of second pole (AB) = 24 m

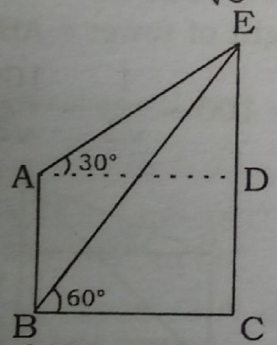
A.T.Q.,

$$\frac{AE}{ED} = \text{cosec } 60°$$

$$AE = (CE - AB) \times \frac{2}{\sqrt{3}}$$

$$= 12 \times \frac{2}{\sqrt{3}} = 8\sqrt{3} \text{ m}$$

24. (C)



Height of Hill = 200 m

A.T.Q.,

$$BC = EC \cot 60°$$

$$= 200 \times \frac{1}{\sqrt{3}} = \frac{200}{\sqrt{3}} \text{ m}$$

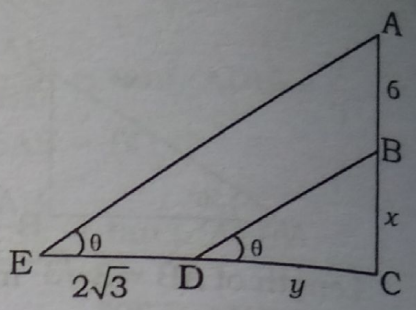
$$ED = AD \tan 30° \text{ [AD = BC]}$$

$$= \frac{200}{\sqrt{3}} \times \frac{1}{\sqrt{3}} = \frac{200}{3}$$

Height of tower = EC – ED

$$= 200 - \frac{200}{3} = \frac{400}{3} = 133\frac{1}{3} \text{ m}$$

25. (B)



Let x = height of the tower

y = Length of shadow of the tower

If θ is the required angle

then $\quad \tan\theta = \frac{x}{y} = \frac{(6+x)}{2\sqrt{3}+y}$

$$\Rightarrow \quad 2\sqrt{3}x + xy = 6y + xy$$

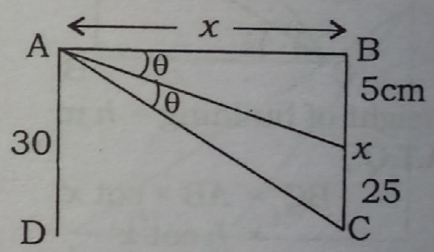
$$\Rightarrow \quad 2\sqrt{3}x = 6y$$

$$\Rightarrow \quad \frac{x}{y} = \frac{6}{2\sqrt{3}}$$

$$\Rightarrow \quad \tan\theta = \frac{x}{y} = \sqrt{3}$$

$$\theta = 60°$$

26. (B)



$$\tan\theta = \frac{5}{x}, \tan 2\theta = \frac{30}{x}$$

$$\tan 2\theta = 6 \tan\theta$$

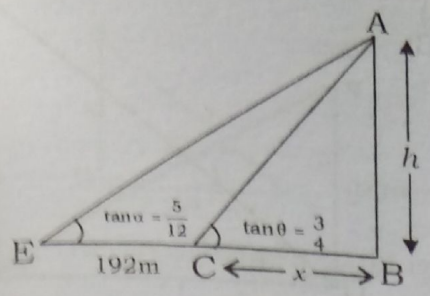
$$\Rightarrow \quad \frac{2\tan\theta}{1-\tan^2\theta} = 6\tan\theta$$

$$\Rightarrow \quad \tan^2\theta = \frac{2}{3}$$

$$\Rightarrow \quad \tan\theta = \sqrt{\frac{2}{3}}$$

$$x = \frac{5}{\tan\theta} = \frac{5\sqrt{3}}{\sqrt{2}}$$

27. (B)



Given $\tan\alpha = \frac{5}{12}$, $\tan\theta = \frac{3}{4}$

$\Rightarrow \quad \tan\alpha = \frac{h}{192+x} = \frac{5}{12} \quad \ldots (i)$

$\Rightarrow \quad \tan\theta = \frac{h}{x} = \frac{3}{4} \quad \ldots (ii)$

$\Rightarrow \quad x = \frac{4h}{3}$

putting the value of x in *(i)*

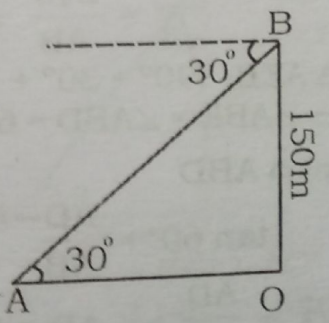
we get = $5(576 + 4h) = 36h$

$\Rightarrow 2880 + 20h = 36h$

$16h = 2880$

$\Rightarrow \quad h = 180$ metres

28. (B)



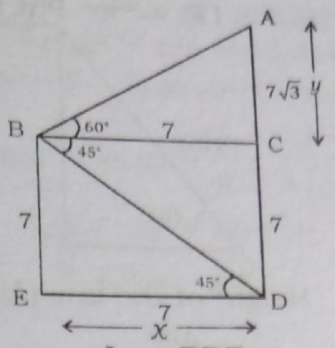
$\tan 30^\circ = \frac{OB}{OA}$

$\Rightarrow OA = \frac{OB}{\tan 30^0}$

$= \frac{150}{\frac{1}{\sqrt{3}}}$

$OA = 150\sqrt{3}$ m

29. (A) (BC = ED = x)



In $\triangle BDE$

$\tan 45^\circ = \frac{7}{x} \Rightarrow x = 7$

In $\triangle ABC$, $\tan 60 = \frac{AC}{BC} = \frac{y}{x}$

$\sqrt{3} = \frac{y}{7}$

$\Rightarrow y = 7\sqrt{3}$

so height of the TV tower

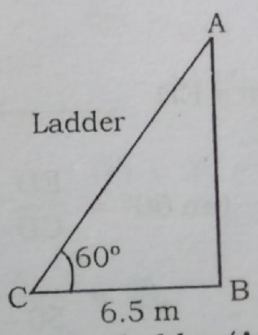
$\Rightarrow 7 + 7\sqrt{3} = 7(1 + \sqrt{3})$

30. (B) $\tan\theta = \frac{20}{11.55}$

$= 1.73160 \approx \sqrt{3}$

$\theta = 60^\circ$

31. (D)

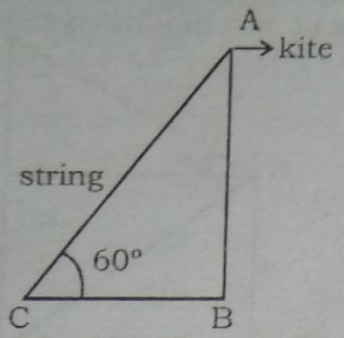


Length of the ladder (AC) = BC sec 60°

= 6.5 × 2

= 13 m

32. (A)



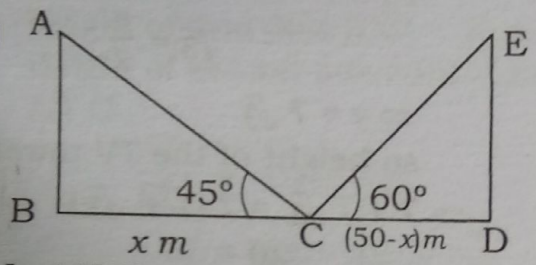
Height of the kite (AB) = 75 m

$$\frac{AB}{AC} = \sin 60°$$

$$AC = 75 \times \frac{2}{\sqrt{3}}$$

$$= 50\sqrt{3} \text{ m}$$

33. (D)



In ΔABC,

$$\tan 45° = \frac{AB}{BC}$$

$$1 = \frac{AB}{x}$$

AB = x m = ED _____(i)

In ΔEDC,

$$\tan 60° = \frac{ED}{CD}$$

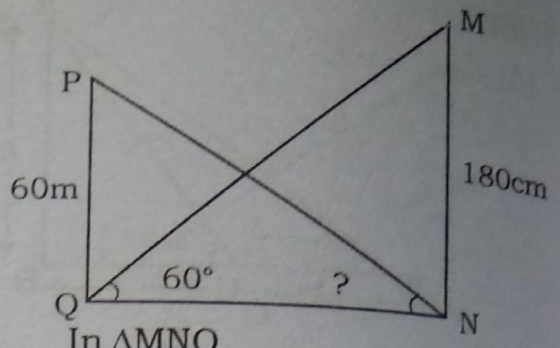
$$\sqrt{3} = \frac{x}{50 - x}$$

$$50\sqrt{3} - x\sqrt{3} = x$$

$$x(1+\sqrt{3}) = 50\sqrt{3}$$

$$\Rightarrow \quad x = \frac{50\sqrt{3}}{(1+\sqrt{3})} m$$

34. (A)



In ΔMNQ,

$$\tan 60° = \frac{180}{QN}$$

$$\Rightarrow \quad QN = \frac{180}{\sqrt{3}} = 60\sqrt{3} \text{ m}$$

In ΔPQN

$$\tan\theta = \frac{PQ}{QN} = \frac{60}{60\sqrt{3}} = \frac{1}{\sqrt{3}}$$

$$\theta = 30°$$

35. (C) Length of tree having 24m shadow

$$= \frac{24}{18} \times 60 = 80 \text{ m}$$

36. (D) In Δ ABC

$$\tan 30° = \frac{BC}{AB}$$

$$\frac{1}{\sqrt{3}} = \frac{2\sqrt{3}}{AB} \Rightarrow AB = 6 \text{ cm}$$

In Δ AEB, $(90° + 30° + \angle ABE = 180°)$

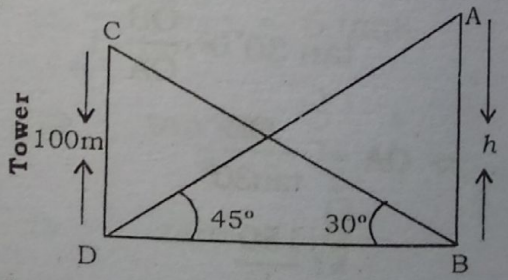
$\Rightarrow \angle ABE = \angle ABD = 60°$

In Δ ABD

$$\tan 60° = \frac{AD}{AB}$$

$$\sqrt{3} = \frac{AD}{6} \Rightarrow AD = 6\sqrt{3} \text{ sm}$$

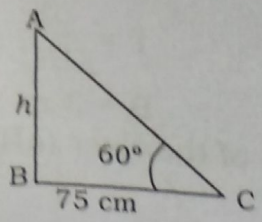
37. (D)



Let the height of the hill be '*h*' meter

In Δ CDB

38. (A)



Let the tree breaks at height h

$$\tan 60^\circ = \frac{h}{75}$$

$$h = 75\sqrt{3} \text{ cm}$$

$$\text{Sin } 60^\circ = \frac{h}{AC}$$

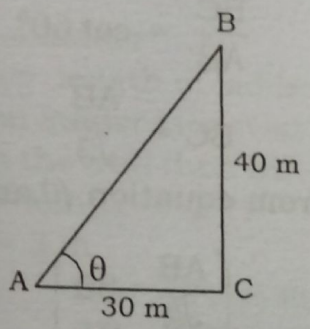
$$AC = \frac{75\sqrt{3}}{\sqrt{3}} \times 2 = 150 \text{ cm}$$

Total length = AB + AC

$$= 75\sqrt{3} + 150 \text{ cm}$$

$$= 75\,(\sqrt{3} + 2) \text{ cm}$$

39. (C) Let BC be the wall & AB be the ladder.



$$AB^2 = BC^2 + AC^2$$

$$= (40)^2 + (30)^2$$

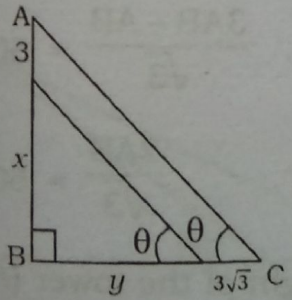
$$= 1600 + 900$$

$$AB^2 = 2500$$

$$AB = \sqrt{2500}$$

$$AB = 50 \text{ m}$$

40.(A)



Let x = height of the tower
y = length of the shadow of the tower if θ is required angle,

then, $\tan\theta = \frac{x}{y} = \frac{3+x}{3\sqrt{3}+y}$

$$\Rightarrow \quad 3\sqrt{3}\,x + xy = 3y + xy$$

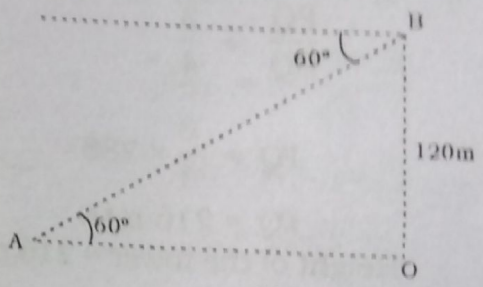
$$3\sqrt{3}\,x = 3y$$

$$\frac{x}{y} = \frac{3}{3\sqrt{3}}$$

$$\Rightarrow \quad \tan\theta = \frac{x}{y} = \frac{1}{\sqrt{3}}$$

$$\Rightarrow \quad \theta = 30^\circ$$

41.(B)



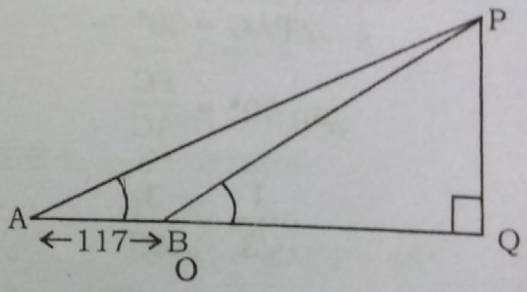
$$\tan 60^\circ = \frac{BO}{OA}$$

$$OA = \frac{OB}{\sqrt{3}}$$

$$OA = \frac{120 \times \sqrt{3}}{3}$$

$$OA = 40\sqrt{3} \text{ m}$$

42.(C)



$$\tan A = \frac{8}{15}$$

$$\tan B = \frac{3}{4}$$

$$\frac{8}{15} = \frac{PQ}{AQ}$$