EduSahara™ Worksheet

Name : Chapter Based Worksheet

Chapter : Heights and Distances

Grade : ICSE Grade X

1. A flag is hoisted at the top of a building . From a point on the ground, the angle of elevation of the top of the flag staff is 60° and the angle of elevation of the top of the building is 30°. If the height of the building is 7 m, find the height of the flag staff .

(i) 9.00 m (ii) 19.00 m (iii) 17.00 m (iv) 11.00 m (v) 14.00 m

2. The angle of elevation of the top of a building from the foot of a tower is 44°39'. The angle of elevation of the top of the tower from the foot of the building is 38°39'. If the height of the tower is 50 m, find the height of the building .

From Table of Natural Tangents

x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
44	0.9657	0.9691	0.9725	0.9759	0.9793	0.9827	0.9861	0.9896	0.9930	0.9965	6	11	17	23	28

From Table of Natural Tangents

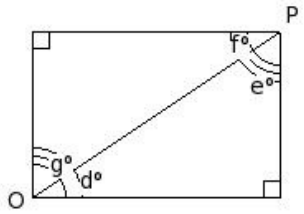
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
38	0.7813	0.7841	0.7869	0.7898	0.7926	0.7954	0.7983	0.8012	0.8040	0.8069	5	9	14	19	23

(i) 61.76 m (ii) 66.76 m (iii) 56.76 m (iv) 58.76 m (v) 64.76 m

3. From a point 120 m away from a vertical cliff, the angles of elevation of the top and the foot of a vertical pillar at the top of the cliff are 60° and 45° respectively. Find the height of the cliff.

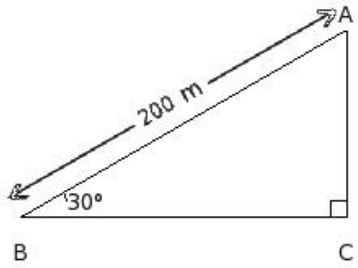
(i) 120.00 m (ii) 128.00 m (iii) 114.00 m (iv) 103.00 m (v) 147.00 m

4. If P is the point of observation and the observed object is at point O, which of the following angles represent the angle of depression ?



(i) ∠f (ii) ∠d (iii) ∠g (iv) ∠e

5. A radio tower stands vertically on the ground. From a point on the ground, the angle of elevation of the top of the radio tower is found to be 30°. If the distance between the point and the top of the radio tower is 200 m, find the distance between the observation point and the foot of the radio tower.



(i) 300 m (ii) 100 m (iii) $150\sqrt{2}$ m (iv) $100\sqrt{18}$ m (v) $100\sqrt{3}$ m

6. A tower stands vertically on the ground. From a point on the ground, the angle of elevation of the top of the tower is found to be $\tan^{(-1)}(\frac{2}{5})$. If the height of the tower is 70 m, find the distance between the observation point and the foot of the tower.

(i) 150.00 m (ii) 163.00 m (iii) 191.00 m (iv) 198.00 m (v) 175.00 m

7. A flag is hoisted at the top of a building . From a point on the ground, the angle of elevation of the top of the flag staff is 41°5' and the angle of elevation of the top of the building is 32°8'. If the height of the building is 17 m, find the height of the flag staff .

From Table of Natural Tangents															
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
32	0.6249	0.6273	0.6297	0.6322	0.6346	0.6371	0.6395	0.6420	0.6445	0.6469	4	8	12	17	21

From Table of Natural Tangents															
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
41	0.8693	0.8724	0.8754	0.8785	0.8816	0.8847	0.8878	0.8910	0.8941	0.8972	5	10	16	21	26

(i) 7.60 m (ii) 8.60 m (iii) 5.60 m (iv) 4.60 m (v) 6.60 m

8. The angles of depression of two boats from the top of a cliff 190 m high are 34° and 49° respectively. Find the distance between the boats, if the boats are on the opposite sides of the cliff .

From Table of Natural Tangents															
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
56	1.4826	1.4882	1.4938	1.4994	1.5051	1.5108	1.5166	1.5224	1.5282	1.5340	10	19	29	38	48

From Table of Natural Tangents															
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
41	0.8693	0.8724	0.8754	0.8785	0.8816	0.8847	0.8878	0.8910	0.8941	0.8972	5	10	16	21	26

(i) 446.86 m (ii) 430.86 m (iii) 459.86 m (iv) 442.86 m

9. A flag is hoisted at the top of a building . From a point on the ground, the angle of elevation of the top of the flag staff is 37°52' and the angle of elevation of the top of the building is 33°52'. If the height of the flag staff is 6 m, find the height of the building .

From Table of Natural Tangents															
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
33	0.6494	0.6519	0.6544	0.6569	0.6594	0.6619	0.6644	0.6669	0.6694	0.6720	4	8	13	17	21

From Table of Natural Tangents															
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
37	0.7536	0.7563	0.7590	0.7618	0.7646	0.7673	0.7701	0.7729	0.7757	0.7785	5	9	14	19	23

(i) 42.81 m (ii) 40.81 m (iii) 34.81 m (iv) 37.81 m (v) 32.81 m

10. From the top of a light house which is 30 m high from the sea level, the angles of depression of two ships are 60° and 45°. If one ship is exactly behind the other on the same side of the light house , find the distance between the two ships.

(i) 17.68 m (ii) 7.68 m (iii) 12.68 m (iv) 9.68 m (v) 15.68 m

11. The angle of elevation of the top of a building from the foot of a tower is 30°. The angle of elevation of the top of the tower from the foot of the building is 60°. If the height of the tower is 85 m, find the height of the building .

(i) 28.33 m (ii) 23.33 m (iii) 33.33 m (iv) 31.33 m (v) 25.33 m

12. From a point 70 m away from a vertical cliff, the angles of elevation of the top and the foot of a vertical pillar at the top of the cliff are 49°39' and 33°45' respectively. Find the height of the cliff.

From Table of Natural Tangents															
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
33	0.6494	0.6519	0.6544	0.6569	0.6594	0.6619	0.6644	0.6669	0.6694	0.6720	4	8	13	17	21

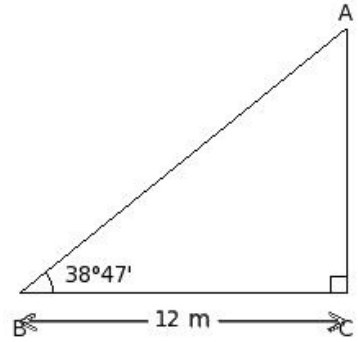
From Table of Natural Tangents															
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
49	1.1504	1.1544	1.1585	1.1626	1.1667	1.1708	1.1750	1.1792	1.1833	1.1875	7	14	21	27	34

(i) 46.77 m (ii) 41.77 m (iii) 51.77 m (iv) 49.77 m (v) 43.77 m

13. A tower stands vertically on the ground. From a point on the ground, the angle of elevation of the top of the tower is found to be 38°47'. If the distance between the observation point and the foot of the tower is 12 m, find the distance between the observation point and the top of the tower.

From Table of Natural Tangents															
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
38	0.7813	0.7841	0.7869	0.7898	0.7926	0.7954	0.7983	0.8012	0.8040	0.8069	5	9	14	19	23

From Table of Natural Cosines															
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
38	0.7880	0.7869	0.7859	0.7848	0.7837	0.7826	0.7815	0.7804	0.7793	0.7782	2	4	5	7	9



(i) 12.39 m (ii) 20.39 m (iii) 15.39 m (iv) 18.39 m (v) 10.39 m

14. A tower stands vertically on the ground. From a point on the ground, the angle of elevation of the top of the tower is found to be $\cos^{(-1)}(\frac{1}{2})$. If the distance between the point and the foot of the tower is 90 m, find the distance between the observation point and the top of the tower.

(i) 173.00 m (ii) 202.00 m (iii) 180.00 m (iv) 196.00 m (v) 165.00 m

15. There are two temples one on each bank of a river, just opposite to each other. One of the temples is 70 m high. As observed from the top of this temple, the angles of depression of the top and foot of the other temple are 30° and 60° respectively. Find the height of the other temple.

(i) 43.67 m (ii) 49.67 m (iii) 51.67 m (iv) 46.67 m (v) 41.67 m

16. A boy standing on a vertical cliff in a jungle observes two rest houses in line with him on opposite sides deep in the jungle below. If their angles of depression are 33° and 27° and the distance between them is 220 m , find the height of the cliff.

From Table of Natural Tangents															
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
33	0.6494	0.6519	0.6544	0.6569	0.6594	0.6619	0.6644	0.6669	0.6694	0.6720	4	8	13	17	21

From Table of Natural Tangents															
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
27	0.5095	0.5117	0.5139	0.5161	0.5184	0.5206	0.5228	0.5250	0.5272	0.5295	4	7	11	15	18

(i) 67.81 m (ii) 65.81 m (iii) 59.81 m (iv) 62.81 m (v) 57.81 m

17. There are two temples one on each bank of a river, just opposite to each other. One of the temples is 80 m high. As observed from the top of this temple, the angles of depression of the top and foot of the other temple are 32°11' and 41°53' respectively. Find the width of the river .

From Table of Natural Tangents															
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
32	0.6249	0.6273	0.6297	0.6322	0.6346	0.6371	0.6395	0.6420	0.6445	0.6469	4	8	12	17	21

From Table of Natural Tangents															
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
41	0.8693	0.8724	0.8754	0.8785	0.8816	0.8847	0.8878	0.8910	0.8941	0.8972	5	10	16	21	26

(i) 86.22 m (ii) 89.22 m (iii) 84.22 m (iv) 92.22 m (v) 94.22 m

18. A man in a boat rowing away from a lighthouse 95 m high, takes 4.5 min to change the angle of elevation of the top of the lighthouse from 43° to 41°. Find the speed of the boat.

From Table of Natural Tangents															
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
41	0.8693	0.8724	0.8754	0.8785	0.8816	0.8847	0.8878	0.8910	0.8941	0.8972	5	10	16	21	26

From Table of Natural Tangents															
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
43	0.9325	0.9358	0.9391	0.9424	0.9457	0.9490	0.9523	0.9556	0.9590	0.9623	6	11	17	22	28

(i) 2.03 m/sec (ii) 7.03 m/sec (iii) 0.03 m/sec (iv) 1.03 m/sec (v) 8.03 m/sec

19. The angles of depression of two boats from the top of a cliff 50 m high are 60° and 45° respectively. Find the distance between the boats, if the boats are on the same side of the cliff .

(i) 21.13 m (ii) 16.13 m (iii) 24.13 m (iv) 26.13 m (v) 18.13 m

20. From the top of a light house which is 100 m high from the sea level, the angles of depression of two ships are 47°38' and 23°55'. If one ship is exactly behind the other on the same side of the light house , find the distance between the two ships.

From Table of Natural Tangents															
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
47	1.0724	1.0761	1.0799	1.0837	1.0875	1.0913	1.0951	1.0990	1.1028	1.1067	6	13	19	25	32

From Table of Natural Tangents															
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
23	0.4245	0.4265	0.4286	0.4307	0.4327	0.4348	0.4369	0.4390	0.4411	0.4431	3	7	10	14	17

(i) 134.32 m (ii) 118.32 m (iii) 152.32 m (iv) 160.32 m (v) 127.32 m

21. A man 1.3 m tall stands at a distance of 9.9 m from a lamp post and casts a shadow of 7.6 m on the ground. Find the height of the lamp post .

(i) 4.99 m (ii) 0.99 m (iii) 2.99 m (iv) 3.99 m (v) 1.99 m

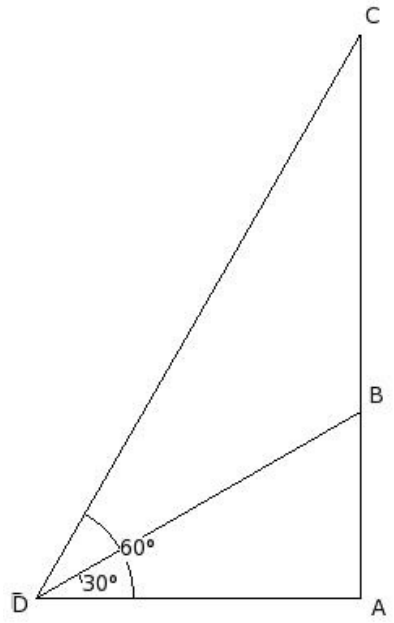
22. A man on the top of a vertical observation tower observes a car moving at a uniform speed coming directly towards him. If it takes 14 min for the angle of depression to change from 30° to 45°, how soon after this, will the car reach the observation tower?

(i) 20 min 14 sec (ii) 21 min 15 sec (iii) 16 min 11 sec (iv) 18 min 12 sec (v) 19 min 8 sec

23. A tower stands vertically on the ground. From a point on the ground, the angle of elevation of the top of the tower is found to be $\cot^{(-1)}(\frac{4}{5})$. If the distance between the point and the foot of the tower is 170 m, find the height of the tower.

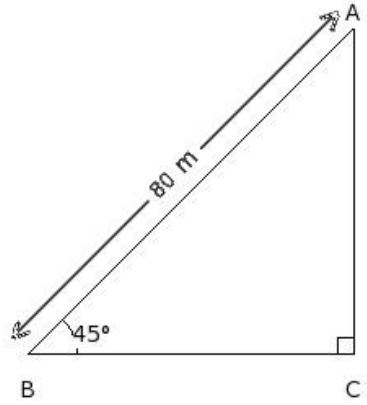
(i) 212.50 m (ii) 224.50 m (iii) 198.50 m (iv) 204.50 m (v) 226.50 m

24. A flagstaff stands on the top of a building at a distance of 25 m away from the foot of building . The angle of elevation of the top of the flagstaff is 60° and the angle of elevation of the top of the building is 30°. Find the height of the flagstaff .



(i) $\frac{50}{3}$ m (ii) $\frac{50}{3}\sqrt{18}$ m (iii) $25\sqrt{2}$ m (iv) $\frac{50}{3}\sqrt{3}$ m (v) 50 m

25. A building stands vertically on the ground. From a point on the ground, the angle of elevation of the top of the building is found to be 45°. If the distance between the point and the top of the building is 80 m, find the height of the building.



(i) 40 m (ii) $80\sqrt{3}$ m (iii) $20\sqrt{12}$ m (iv) $40\sqrt{2}$ m (v) 80 m

Assignment Key

1) (v)	2) (i)	3) (i)	4) (i)	5) (v)	6) (v)
7) (v)	8) (i)	9) (iv)	10) (iii)	11) (i)	12) (i)
13) (iii)	14) (iii)	15) (iv)	16) (iv)	17) (ii)	18) (iii)
19) (i)	20) (i)	21) (iii)	22) (v)	23) (i)	24) (iv)
25) (iv)					