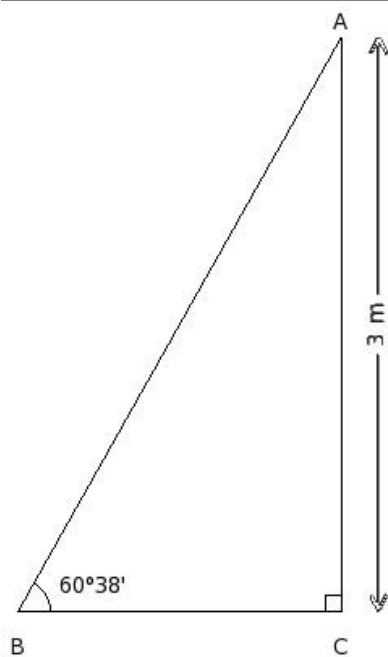A tower stands vertically on the ground. From a point on the ground, the angle of elevation of the top of the tower is found to be 60°38'. If the height of the tower is 3 m, find the distance between the observation point and the top of the tower.

1.

| x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
From Table of Natural Tangents															
60	1.7321	1.7391	1.7461	1.7532	1.7603	1.7675	1.7747	1.7820	1.7893	1.7966	12	24	36	48	60
From Table of Natural Sines															
60	0.8660	0.8669	0.8678	0.8686	0.8695	0.8704	0.8712	0.8721	0.8729	0.8738	1	3	4	6	7

(i) 5.44 m (ii) 3.44 m (iii) 1.44 m (iv) 4.44 m (v) 2.44 m

2. 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 56°11'. If the height of the tower is 4 m, find the distance between the observation point and the foot of the tower.

x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
From Table of Natural Tangents															
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

| x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
From Table of Natural Sines															
56	0.8290	0.8300	0.8310	0.8320	0.8329	0.8339	0.8348	0.8358	0.8369	0.8377	2	3	5	7	8
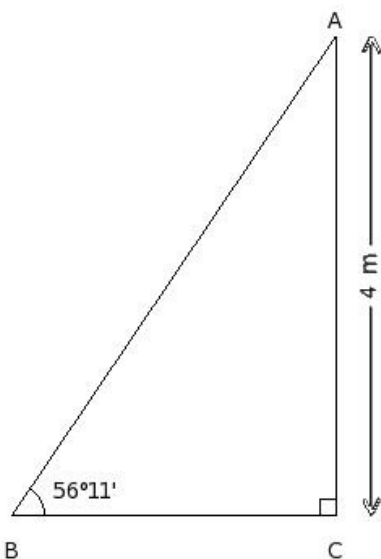
(i) 4.68 m   (ii) 0.68 m   (iii) 1.68 m   (iv) 2.68 m   (v) 3.68 m

---

3. A pole stands vertically on the ground. From a point on the ground, the angle of elevation of the top of the pole is found to be 32°23'. If the distance between the observation point and the foot of the pole is 19 m, find the distance between the observation point and the top of the pole.

x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
From Table of Natural Tangents															
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

| x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
From Table of Natural Cosines															
32	0.8480	0.8471	0.8462	0.8453	0.8443	0.8434	0.8425	0.8415	0.8406	0.8393	2	3	5	6	8
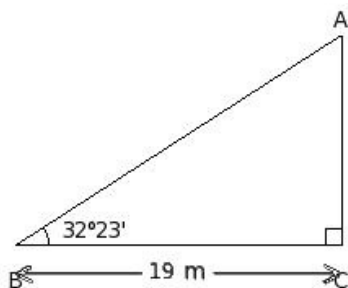
(i) 22.50 m   (ii) 27.50 m   (iii) 25.50 m   (iv) 19.50 m   (v) 17.50 m

4. 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 48°13'. If the distance between the observation point and the foot of the building is 10 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'
48	1.1106	1.1145	1.1184	1.1224	1.1263	1.1303	1.1343	1.1383	1.1423	1.1463	7	13	20	27	33

	From Table of Natural Cosines														
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
48	0.6691	0.6678	0.6665	0.6652	0.6639	0.6626	0.6613	0.6600	0.6587	0.6574	2	4	7	9	11
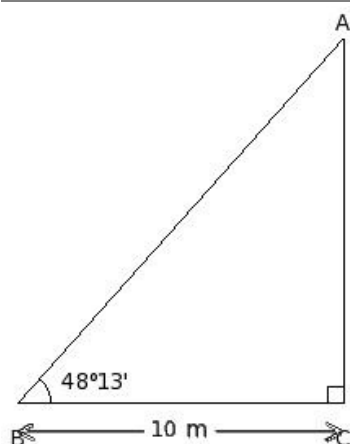
(i) 6.19 m   (ii) 16.19 m   (iii) 11.19 m   (iv) 8.19 m   (v) 14.19 m

---

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 39°30'. If the distance between the observation point and the top of the radio tower is 15 m, find the height of the radio tower.

From Table of Natural Sines														
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
39	0.6293	0.6307	0.6320	0.6334	0.6347	0.6361	0.6374	0.6388	0.6401	0.6414	2	5	7	9	12

From Table of Natural Cosines														
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
39	0.7771	0.7760	0.7749	0.7738	0.7727	0.7216	0.7705	0.7694	0.7683	0.7672	2	4	6	7	9
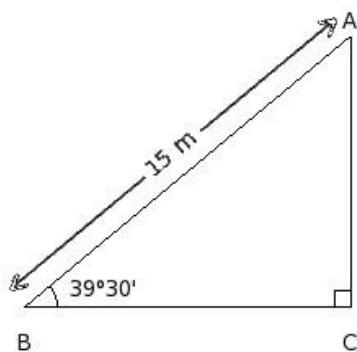
(i) 10.54 m   (ii) 8.54 m   (iii) 7.54 m   (iv) 11.54 m   (v) 9.54 m

6. A chimney stands vertically on the ground. From a point on the ground, the angle of elevation of the top of the chimney is found to be 34°8'. If the distance between the observation point and the top of the chimney is 1 m, find the distance between the observation point and the foot of the chimney.

From Table of Natural Sines

x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
34	0.5592	0.5606	0.5621	0.5635	0.5650	0.5664	0.5678	0.5693	0.5707	0.5721	2	5	7	9	12

From Table of Natural Cosines

x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
34	0.8290	0.8281	0.8271	0.8261	0.8251	0.8241	0.8231	0.8221	0.8211	0.8202	2	3	5	7	8
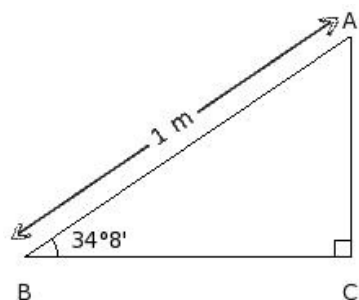
(i) 1.83 m   (ii) 7.83 m   (iii) 0.83 m   (iv) 8.83 m   (v) 2.83 m

---

7. The upper part of a tree is broken into two parts without being detatched. It makes an angle of 56°34' with the ground. The top of the tree touches the ground at a distance of 90 m from the foot of the tree . Find the height of the tree before it was broken.

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 Cosines

x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
56	0.5592	0.5577	0.5563	0.5548	0.5534	0.5519	0.5505	0.5490	0.5476	0.5461	2	5	7	10	12

(i) 297.68 m   (ii) 299.68 m   (iii) 312.68 m   (iv) 274.68 m

---

8. There are two temples one on each bank of a river, just opposite to each other. One of the temples is 100 m high. As observed from the top of this temple, the angles of depression of the top and foot of the other temple are 42°28' and 62°48' 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'
42	0.9004	0.9036	0.9067	0.9099	0.9131	0.9163	0.9195	0.9228	0.9260	0.9293	5	11	16	21	27

From Table of Natural Tangents

x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
62	1.8807	1.8887	1.8967	1.9047	1.9128	1.9210	1.9292	1.9375	1.9458	1.9542	14	27	41	55	68

(i) 54.39 m   (ii) 48.39 m   (iii) 46.39 m   (iv) 51.39 m   (v) 56.39 m

---

9. There are two temples one on each bank of a river, just opposite to each other. One of the temples is 170 m high. As observed from the top of this temple, the angles of depression of the top and foot of the other temple are 42°22' and 59°19' respectively. Find the height of the other temple.

From Table of Natural Tangents

x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
42	0.9004	0.9036	0.9067	0.9099	0.9131	0.9163	0.9195	0.9228	0.9260	0.9293	5	11	16	21	27

From Table of Natural Tangents

x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
59	1.6643	1.6709	1.6775	1.6842	1.6909	1.6977	1.7045	1.7113	1.7182	1.7251	11	23	34	45	56

(i) 73.00 m   (ii) 81.00 m   (iii) 83.00 m   (iv) 75.00 m   (v) 78.00 m

10. An observer 1.7 m tall, is 150 m away from a tower . The angle of elevation of the top of the tower from her eyes is 37°14'. Find the height of the tower .

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) 115.69 m   (ii) 122.69 m   (iii) 127.69 m   (iv) 91.69 m   (v) 103.69 m

---

11. An aeroplane is flying horizontally 1000 m above the ground. From a point of observation, which lies exactly below the path of the aeroplane, the angle of elevation at a certain instant is 58°. After 20 sec , its elevation from the same point changes to 39°. Find the uniform speed of the aeroplane .

From Table of Natural Tangents

x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
39	0.8098	0.8127	0.8156	0.8185	0.8214	0.8243	0.8273	0.8302	0.8332	0.8361	5	10	15	19	24

From Table of Natural Tangents

x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
58	1.6003	1.6066	1.6128	1.6191	1.6255	1.6319	1.6383	1.6447	1.6512	1.6577	11	21	32	43	53

(i) 102.80 kmph   (ii) 109.80 kmph   (iii) 83.80 kmph   (iv) 114.80 kmph   (v) 133.80 kmph

---

12. Two poles of equal height are standing opposite to each other on either side of a road which is 30 m wide. From a point between them on the road, the angles of elevation of the top of the poles are 36°41' and 40°49' respectively. Find the height of each pole and the distances of the point from the two poles .

From Table of Natural Tangents

x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
36	0.7265	0.7292	0.7319	0.7346	0.7373	0.7400	0.7427	0.7454	0.7481	0.7508	5	9	14	18	23

From Table of Natural Tangents

x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
40	0.8391	0.8421	0.8451	0.8481	0.8511	0.8541	0.8571	0.8601	0.8632	0.8662	5	10	15	20	25

(i) height = 11 m, distances away = 12.89 m, 15.11 m   (ii) height = 14 m, distances away = 15.89 m, 18.11 m

(iii) height = 10 m, distances away = 11.89 m, 14.11 m

(iv) height = 13 m, distances away = 14.89 m, 17.11 m   (v) height = 12 m, distances away = 13.89 m, 16.11 m

---

13. From the top of a light house which is 40 m high from the sea level, the angles of depression of two ships are 47°33' and 34°58'. 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'
34	0.6745	0.6771	0.6796	0.6822	0.6847	0.6873	0.6899	0.6924	0.6930	0.6976	4	9	13	17	22

(i) 15.61 m   (ii) 25.61 m   (iii) 20.61 m   (iv) 23.61 m   (v) 17.61 m

---

14. From the top of a 14 m high building , the angle of elevation of the top of a cable tower is 40°51' and the angle of depression of its foot is 34°37'. Find the height of the cable tower.

From Table of Natural Tangents

x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
40	0.8391	0.8421	0.8451	0.8481	0.8511	0.8541	0.8571	0.8601	0.8632	0.8662	5	10	15	20	25

From Table of Natural Tangents

x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
34	0.6745	0.6771	0.6796	0.6822	0.6847	0.6873	0.6899	0.6924	0.6930	0.6976	4	9	13	17	22

(i) 28.54 m   (ii) 26.54 m   (iii) 36.54 m   (iv) 31.54 m   (v) 34.54 m

15. The angle of elevation of the top of a building from the foot of a tower is 34°11'. The angle of elevation of the top of the tower from the foot of the building is 30°49'. If the height of the tower is 25 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'
34	0.6745	0.6771	0.6796	0.6822	0.6847	0.6873	0.6899	0.6924	0.6930	0.6976	4	9	13	17	22

					From Table of Natural Tangents									
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
30	0.5774	0.5797	0.5820	0.5844	0.5867	0.5890	0.5914	0.5938	0.5961	0.5985	4	8	12	16	20

(i) 25.47 m   (ii) 31.47 m   (iii) 23.47 m   (iv) 28.47 m   (v) 33.47 m

---

16. 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 49°7' and the angle of elevation of the top of the building is 48°31'. If the height of the building is 16 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'
48	1.1106	1.1145	1.1184	1.1224	1.1263	1.1303	1.1343	1.1383	1.1423	1.1463	7	13	20	27	33

					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) 7.34 m   (ii) 1.34 m   (iii) 2.34 m   (iv) 8.34 m   (v) 0.34 m

---

17. 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 35°44' and the angle of elevation of the top of the building is 27°18'. If the height of the flag staff is 16 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'
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

					From Table of Natural Tangents									
x°	0'	6'	12'	18'	24'	30'	36'	42'	48'	54'	1'	2'	3'	4'	5'
35	0.7002	0.7028	0.7054	0.7080	0.7107	0.7133	0.7159	0.7186	0.7212	0.7239	4	9	13	17	22

(i) 40.60 m   (ii) 45.60 m   (iii) 35.60 m   (iv) 37.60 m   (v) 43.60 m

Assignment Key

1) (ii)	2) (iv)	3) (i)	4) (iii)	5) (v)	6) (iii)
7) (ii)	8) (iv)	9) (v)	10) (i)	11) (ii)	12) (v)
13) (iii)	14) (iv)	15) (iv)	16) (v)	17) (i)	