The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE III

Friday, January 27, 1984 — 9:15 a.m. to 12:15 p.m., only

The last page of the booklet is the answer sheet. Fold the last page along the perforations and, slowly, and carefully, tear off the answer sheet. Then fill in the heading of your answer sheet.

The "Reference Tables for Mathematics" and a formula sheet which you may need to answer some questions in this examination are included in this booklet following page 6.

When you have completed the examination, you must sign the statement printed at the end of the answer paper, indicating that you had no unlawful knowledge of the questions or answers prior to the examination and that you have neither given nor received assistance in answering any of the questions during the examination. Your answer paper cannot be accepted if you fail to sign this declaration.

DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN

Part I

Answer 30 questions from this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Write your answers in the spaces provided on the separate answer sheet. Where applicable, answers may be left in terms of π or in radical form.

1 Express 260° in radian measure.

2 Find the value of $\sin^2 \frac{\pi}{3}$.

3 If $f(x) = x + x^{-1}$, find the value of $f(4)$.

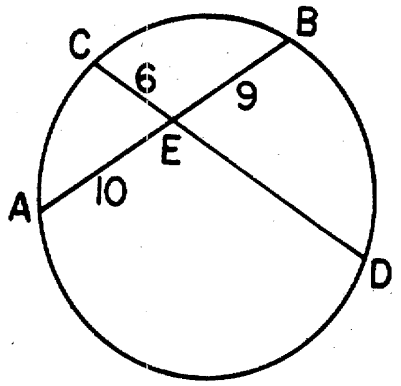
4 Express in simplest form: $\dfrac{x - \frac{1}{x}}{1 - \frac{1}{x}}$

5 Evaluate: $\sum_{k=1}^{3} \frac{1}{2}(k^2)$

6 Express $\cos(-220°)$ as a function of a positive acute angle.

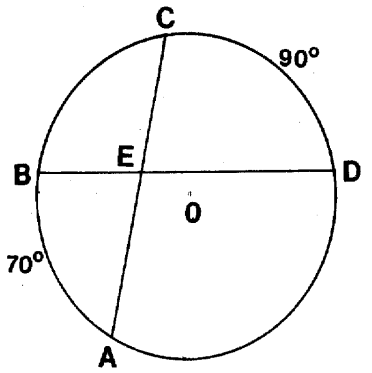
7 Find x if $\log_9 x = \frac{3}{2}$.

8 In the accompanying diagram, $\overline{AB}$ and $\overline{CD}$ are chords of the circle and intersect at E. If $AE = 10$, $EB = 9$, and $CE = 6$, find DE.



9 In a circle, a central angle of 3 radians intercepts an arc of length 12. What is the length of the radius of the circle?

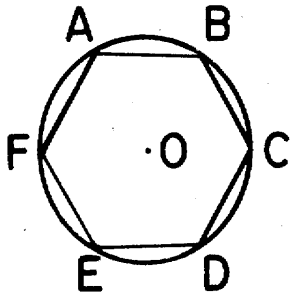
10 In the accompanying diagram, $\overline{AC}$ and $\overline{BD}$ are chords of circle O and intersect at E. If $m\overset{\frown}{AB} = 70$ and $m\overset{\frown}{CD} = 90$, find $m\angle BEA$.



11 If the solution set of $x^2 + px + q = 0$ is $\{1 + i, 1 - i\}$, find the value of p.

12 Find the value of log 58.43 to four decimal places.

13 In the accompanying diagram, regular hexagon $ABCDEF$ is inscribed in circle O. With O as the center of rotation find $\text{Rot}_{(-120°)} \circ \text{Rot}_{(240°)} (A)$.



14 In $\triangle ABC$, $\sin A = \frac{1}{3}$, $\sin B = \frac{1}{5}$, and $b = 6$. Find side a.

15 If $4^{2x} = 2^{3x+2}$, find the value of x.

16 Express in terms of i the sum of $\sqrt{-25} + 2\sqrt{-36}$.

17 Find tan (Arc cos $\frac{3}{5}$).

18 For what value of k are the roots of $2x^2 - 8x + k = 0$ equal?

Directions (19–35): For *each* question chosen, write on the separate answer sheet the *numeral* preceding the word or expression that best completes the statement or answers the question.

19 Which letter has both vertical and horizontal line symmetry?

(1) A
(2) M
(3) T
(4) X

20 Which is *not* an element in the range of the function $y = \cos x$?

(1) 1
(2) 2
(3) $\frac{1}{2}$
(4) $-\frac{1}{2}$

21 The expression $(2 + i)^2$ is equivalent to

(1) $3 + 4i$
(2) $5 + 4i$
(3) 3
(4) 5

22 The fifth term in the expansion of $(2x - y)^6$ is

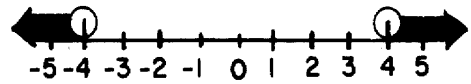
(1) $240x^2y^4$
(2) $-240x^2y^4$
(3) $60x^2y^4$
(4) $-60x^2y^4$

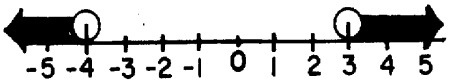
23 On a test, the mean score is 25 and the standard deviation is 2.3. Which score could be expected to occur *less than* 5% of the time?

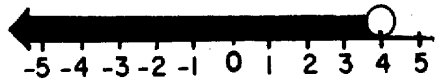
(1) 20
(2) 28
(3) 23
(4) 24

24 Which is the graph of $(-x > 4) \vee (2x - 1 > 7)$?

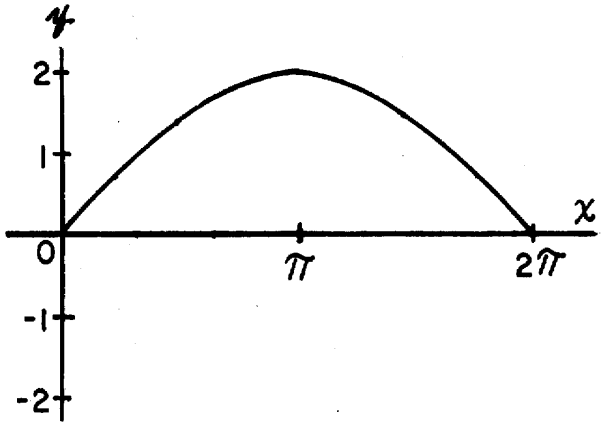
(1)


(2)


(3)


(4)


25 Which is the equation of the graph shown below?



(1) $y = 2 \sin \frac{1}{2}x$
(2) $y = \frac{1}{2} \sin 2x$
(3) $y = 2 \cos \frac{1}{2}x$
(4) $y = \frac{1}{2} \cos 2x$

26 The equation $x = \sqrt{3x + 4}$ has

(1) 4 and -1 as solutions
(2) 4 as its only solution
(3) -1 as its only solution
(4) no solutions

27 If a fair coin is tossed four times, what is the probability of obtaining *at most* one head?

(1) $\frac{1}{16}$
(2) $\frac{4}{16}$
(3) $\frac{5}{16}$
(4) $\frac{11}{16}$

28 If the sum of a number n and ten times its reciprocal is 7, then a value of n may be

(1) $\frac{1}{2}$ (3) 3

(2) 2 (4) 4

29 The expression $2 \sin^2 A + \cos 2A$ is equivalent to

(1) 1 (3) $\sin^2 A$

(2) 2 (4) $-\sin^2 A$

30 The amplitude of the graph of the equation $y = 4 \sin 2x$ is

(1) 1 (3) $\frac{1}{2}$

(2) 2 (4) 4

31 The expression $\frac{1}{3} \log a - 3 \log b$ is equivalent to

(1) $\log (\sqrt[3]{a} - b^3)$ (3) $\log \frac{\sqrt[3]{a}}{b^3}$

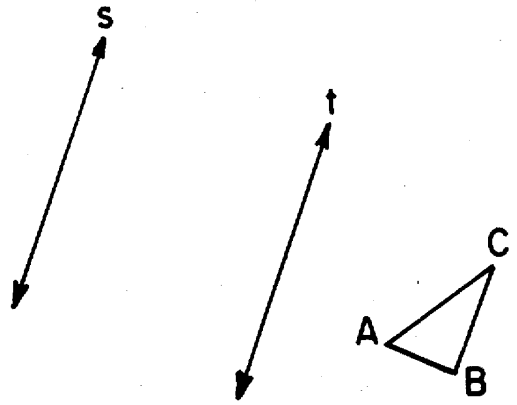
(2) $\log \frac{a}{3b^3}$ (4) $\log \frac{\sqrt[3]{a}}{3b}$

32 The expression $\frac{1}{2 - \sqrt{3}}$ is equivalent to

(1) $2 + \sqrt{3}$ (3) $\frac{2 + \sqrt{3}}{-1}$

(2) $2 - \sqrt{3}$ (4) $\frac{2 - \sqrt{3}}{-1}$

33 In the accompanying diagram, line s is parallel to line t. Which is equivalent to the composition of line reflections $r_s \circ r_t$ ($\triangle ABC$)?



(1) a rotation (3) a translation

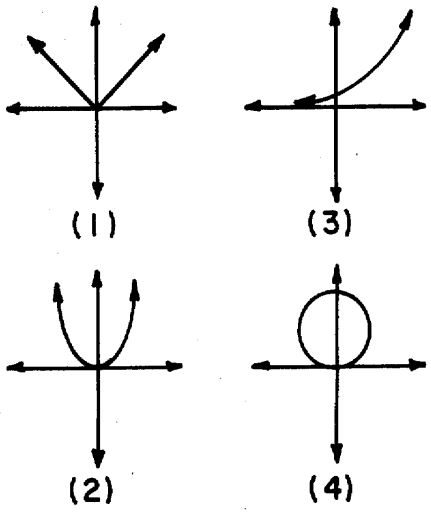
(2) a line reflection (4) a glide-reflection

34 In the interval $0° \leq \theta \leq 360°$, how many values of θ satisfy the equation $\tan^2 \theta - 3 \tan \theta + 2 = 0$?

(1) 1 (3) 3

(2) 2 (4) 4

35 Which graph has point symmetry?



Answers to the following questions are to be written on paper provided by the school.

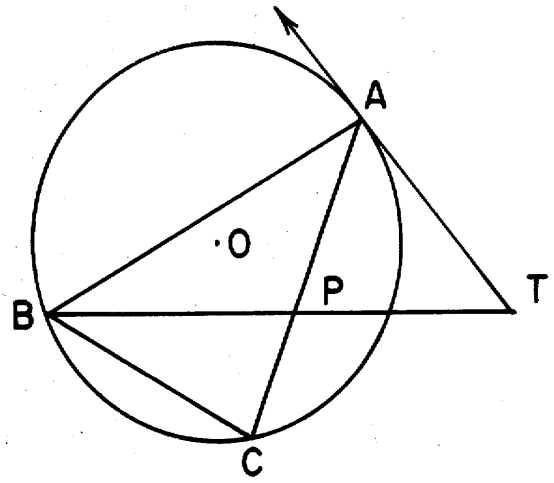
Part II

Answer four questions from this part. Show all work unless otherwise directed.

36 *a* On the same set of axes, sketch and label the graphs of $y = 2\cos\frac{1}{2}x$ and $y = -1$ for the values of x in the interval $0 \leq x \leq 2\pi$. [6,2]

b State the number of values of x in the interval $0 \leq x \leq 2\pi$ that satisfy the equation $2\cos\frac{1}{2}x = -1$. [2]

37 In the accompanying figure, $\triangle ABC$ is inscribed in circle O, $\overline{BT}$ bisects $\angle CBA$, $\overrightarrow{TA}$ is tangent to circle O, and $m\angle BAC : m\angle CBA : m\angle ACB = 2:3:4$.



Find:

a $m\angle BAC$ [2]
b $m\overset{\frown}{BC}$ [2]
c $m\angle CPT$ [2]
d $m\angle PAT$ [2]
e $m\angle T$ [2]

38 In $\triangle ABC$, $a = 10$, $b = 12$, and the measure of angle C is 41° 30′.

a Find the length of side c to the *nearest integer*. [6]

b Find the area of $\triangle ABC$ to the *nearest tenth*. [4]

39 *a* Solve for x to the *nearest tenth*:

$$\log_x 5 = 3$$ [5]

b Express in simplest form:

$$\frac{3a + 1}{a^2 - 1} - \frac{1}{a + 1}$$ [5]

40 Triangle ABC has coordinates $A(1,1)$, $B(5,1)$, and $C(4,3)$. Given the transformations T, U, and W described below:

T: $(x,y) \rightarrow (x,-y)$
U: $(x,y) \rightarrow (x-6,y+6)$
W: $(x,y) \rightarrow (-2x,-2y)$

a Graph $\triangle ABC$ and graph and state the coordinates of its image $\triangle A'B'C'$, after transformation T. [3]

b Graph and state the coordinates of $\triangle A''B''C''$, the image of $\triangle ABC$ after transformation U. [2]

c Graph and state the coordinates of $\triangle A'''B'''C'''$, the image of $\triangle ABC$ after transformation W. [3]

d Which transformation, T, U, or W, is *not* an isometry? [1]

e Which transformation, T, U, or W, does *not* preserve orientation? [1]

☞ **GO RIGHT ON TO THE NEXT PAGE.**

41 Using the following set of data, find

a the mean [3]

b the standard deviation to the *nearest tenth* [7]

x_i measure	f_i frequency
50	4
58	4
62	3
64	6
65	2
68	1

42 *a* Find all values of θ in the interval $0° \leq \theta \leq 360°$ which satisfy the equation $2 \cos \theta + 1 = \sec \theta$. [5]

b Prove the identity:
$\tan A + \cot A = \sec A \csc A$ [5]

Formulas

Pythagorean and Quotient Identities

$$\sin^2 A + \cos^2 A = 1$$
$$\tan^2 A + 1 = \sec^2 A$$
$$\cot^2 A + 1 = \csc^2 A$$

$$\tan A = \frac{\sin A}{\cos A}$$
$$\cot A = \frac{\cos A}{\sin A}$$

Functions of the Sum of Two Angles

$$\sin (A + B) = \sin A \cos B + \cos A \sin B$$
$$\cos (A + B) = \cos A \cos B - \sin A \sin B$$
$$\tan (A + B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$

Functions of the Difference of Two Angles

$$\sin (A - B) = \sin A \cos B - \cos A \sin B$$
$$\cos (A - B) = \cos A \cos B + \sin A \sin B$$
$$\tan (A - B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

Functions of the Double Angle

$$\sin 2A = 2 \sin A \cos A$$
$$\cos 2A = \cos^2 A - \sin^2 A$$
$$\cos 2A = 2 \cos^2 A - 1$$
$$\cos 2A = 1 - 2 \sin^2 A$$
$$\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$$

Functions of the Half Angle

$$\sin \tfrac{1}{2}A = \pm \sqrt{\frac{1 - \cos A}{2}}$$

$$\cos \tfrac{1}{2}A = \pm \sqrt{\frac{1 + \cos A}{2}}$$

$$\tan \tfrac{1}{2}A = \pm \sqrt{\frac{1 - \cos A}{1 + \cos A}}$$

Law of Sines

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

Law of Cosines

$$a^2 = b^2 + c^2 - 2bc \cos A$$

Area of Triangle

$$K = \tfrac{1}{2}ab \sin C$$

Standard Deviation

$$\text{S.D.} = \sqrt{\frac{1}{n} \sum_{i=1}^{n} (\bar{x} - x_i)^2}$$

Reference Tables for Mathematics

(A) Common Logarithms of Numbers*

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N	0	1	2	3	4	5	6	7	8	9
10	0000	0043	0086	0128	0170	0212	0253	0294	0334	0374
11	0414	0453	0492	0531	0569	0607	0645	0682	0719	0755
12	0792	0828	0864	0899	0934	0969	1004	1038	1072	1106
13	1139	1173	1206	1239	1271	1303	1335	1367	1399	1430
14	1461	1492	1523	1553	1584	1614	1644	1673	1703	1732
15	1761	1790	1818	1847	1875	1903	1931	1959	1987	2014
16	2041	2068	2095	2122	2148	2175	2201	2227	2253	2279
17	2304	2330	2355	2380	2405	2430	2455	2480	2504	2529
18	2553	2577	2601	2625	2648	2672	2695	2718	2742	2765
19	2788	2810	2833	2856	2878	2900	2923	2945	2967	2989
20	3010	3032	3054	3075	3096	3118	3139	3160	3181	3201
21	3222	3243	3263	3284	3304	3324	3345	3365	3385	3404
22	3424	3444	3464	3483	3502	3522	3541	3560	3579	3598
23	3617	3636	3655	3674	3692	3711	3729	3747	3766	3784
24	3802	3820	3838	3856	3874	3892	3909	3927	3945	3962
25	3979	3997	4014	4031	4048	4065	4082	4099	4116	4133
26	4150	4166	4183	4200	4216	4232	4249	4265	4281	4298
27	4314	4330	4346	4362	4378	4393	4409	4425	4440	4456
28	4472	4487	4502	4518	4533	4548	4564	4579	4594	4609
29	4624	4639	4654	4669	4683	4698	4713	4728	4742	4757
30	4771	4786	4800	4814	4829	4843	4857	4871	4886	4900
31	4914	4928	4942	4955	4969	4983	4997	5011	5024	5038
32	5051	5065	5079	5092	5105	5119	5132	5145	5159	5172
33	5185	5198	5211	5224	5237	5250	5263	5276	5289	5302
34	5315	5328	5340	5353	5366	5378	5391	5403	5416	5428
35	5441	5453	5465	5478	5490	5502	5514	5527	5539	5551
36	5563	5575	5587	5599	5611	5623	5635	5647	5658	5670
37	5682	5694	5705	5717	5729	5740	5752	5763	5775	5786
38	5798	5809	5821	5832	5843	5855	5866	5877	5888	5899
39	5911	5922	5933	5944	5955	5966	5977	5988	5999	6010
40	6021	6031	6042	6053	6064	6075	6085	6096	6107	6117
41	6128	6138	6149	6160	6170	6180	6191	6201	6212	6222
42	6232	6243	6253	6263	6274	6284	6294	6304	6314	6325
43	6335	6345	6355	6365	6375	6385	6395	6405	6415	6425
44	6435	6444	6454	6464	6474	6484	6493	6503	6513	6522
45	6532	6542	6551	6561	6571	6580	6590	6599	6609	6618
46	6628	6637	6646	6656	6665	6675	6684	6693	6702	6712
47	6721	6730	6739	6749	6758	6767	6776	6785	6794	6803
48	6812	6821	6830	6839	6848	6857	6866	6875	6884	6893
49	6902	6911	6920	6928	6937	6946	6955	6964	6972	6981
50	6990	6998	7007	7016	7024	7033	7042	7050	7059	7067
51	7076	7084	7093	7101	7110	7118	7126	7135	7143	7152
52	7160	7168	7177	7185	7193	7202	7210	7218	7226	7235
53	7243	7251	7259	7267	7275	7284	7292	7300	7308	7316
54	7324	7332	7340	7348	7356	7364	7372	7380	7388	7396
N	0	1	2	3	4	5	6	7	8	9

(A) Common Logarithms of Numbers*

N	0	1	2	3	4	5	6	7	8	9
55	7404	7412	7419	7427	7435	7443	7451	7459	7466	7474
56	7482	7490	7497	7505	7513	7520	7528	7536	7543	7551
57	7559	7566	7574	7582	7589	7597	7604	7612	7619	7627
58	7634	7642	7649	7657	7664	7672	7679	7686	7694	7701
59	7709	7716	7723	7731	7738	7745	7752	7760	7767	7774
60	7782	7789	7796	7803	7810	7818	7825	7832	7839	7846
61	7853	7860	7868	7875	7882	7889	7896	7903	7910	7917
62	7924	7931	7938	7945	7952	7959	7966	7973	7980	7987
63	7993	8000	8007	8014	8021	8028	8035	8041	8048	8055
64	8062	8069	8075	8082	8089	8096	8102	8109	8116	8122
65	8129	8136	8142	8149	8156	8162	8169	8176	8182	8189
66	8195	8202	8209	8215	8222	8228	8235	8241	8248	8254
67	8261	8267	8274	8280	8287	8293	8299	8306	8312	8319
68	8325	8331	8338	8344	8351	8357	8363	8370	8376	8382
69	8388	8395	8401	8407	8414	8420	8426	8432	8439	8445
70	8451	8457	8463	8470	8476	8482	8488	8494	8500	8506
71	8513	8519	8525	8531	8537	8543	8549	8555	8561	8567
72	8573	8579	8585	8591	8597	8603	8609	8615	8621	8627
73	8633	8639	8645	8651	8657	8663	8669	8675	8681	8686
74	8692	8698	8704	8710	8716	8722	8727	8733	8739	8745
75	8751	8756	8762	8768	8774	8779	8785	8791	8797	8802
76	8808	8814	8820	8825	8831	8837	8842	8848	8854	8859
77	8865	8871	8876	8882	8887	8893	8899	8904	8910	8915
78	8921	8927	8932	8938	8943	8949	8954	8960	8965	8971
79	8976	8982	8987	8993	8998	9004	9009	9015	9020	9025
80	9031	9036	9042	9047	9053	9058	9063	9069	9074	9079
81	9085	9090	9096	9101	9106	9112	9117	9122	9128	9133
82	9138	9143	9149	9154	9159	9165	9170	9175	9180	9186
83	9191	9196	9201	9206	9212	9217	9222	9227	9232	9238
84	9243	9248	9253	9258	9263	9269	9274	9279	9284	9289
85	9294	9299	9304	9309	9315	9320	9325	9330	9335	9340
86	9345	9350	9355	9360	9365	9370	9375	9380	9385	9390
87	9395	9400	9405	9410	9415	9420	9425	9430	9435	9440
88	9445	9450	9455	9460	9465	9469	9474	9479	9484	9489
89	9494	9499	9504	9509	9513	9518	9523	9528	9533	9538
90	9542	9547	9552	9557	9562	9566	9571	9576	9581	9586
91	9590	9595	9600	9605	9609	9614	9619	9624	9628	9633
92	9638	9643	9647	9652	9657	9661	9666	9671	9675	9680
93	9685	9689	9694	9699	9703	9708	9713	9717	9722	9727
94	9731	9736	9741	9745	9750	9754	9759	9763	9768	9773
95	9777	9782	9786	9791	9795	9800	9805	9809	9814	9818
96	9823	9827	9832	9836	9841	9845	9850	9854	9859	9863
97	9868	9872	9877	9881	9886	9890	9894	9899	9903	9908
98	9912	9917	9921	9926	9930	9934	9939	9943	9948	9952
99	9956	9961	9965	9969	9974	9978	9983	9987	9991	9996
N	0	1	2	3	4	5	6	7	8	9

* This table gives the mantissas of numbers with the decimal point omitted in each case. Characteristics are determined from the numbers by inspection.

(B) Values of Trigonometric Functions

Angle	Sin	Cos	Tan	Cot	
0° 00′	.0000	1.0000	.0000	—	90° 00′
10	.0029	1.0000	.0029	343.77	50
20	.0058	1.0000	.0058	171.89	40
30	.0087	1.0000	.0087	114.59	30
40	.0116	.9999	.0116	85.940	20
50	.0145	.9999	.0145	68.750	10
1° 00′	.0175	.9998	.0175	57.290	89° 00′
10	.0204	.9998	.0204	49.104	50
20	.0233	.9997	.0233	42.964	40
30	.0262	.9997	.0262	38.188	30
40	.0291	.9996	.0291	34.368	20
50	.0320	.9995	.0320	31.242	10
2° 00′	.0349	.9994	.0349	28.636	88° 00′
10	.0378	.9993	.0378	26.432	50
20	.0407	.9992	.0407	24.542	40
30	.0436	.9990	.0437	22.904	30
40	.0465	.9989	.0466	21.470	20
50	.0494	.9988	.0495	20.206	10
3° 00′	.0523	.9986	.0524	19.081	87° 00′
10	.0552	.9985	.0553	18.075	50
20	.0581	.9983	.0582	17.169	40
30	.0610	.9981	.0612	16.350	30
40	.0640	.9980	.0641	15.605	20
50	.0669	.9978	.0670	14.924	10
4° 00′	.0698	.9976	.0699	14.301	86° 00′
10	.0727	.9974	.0729	13.727	50
20	.0756	.9971	.0758	13.197	40
30	.0785	.9969	.0787	12.706	30
40	.0814	.9967	.0816	12.251	20
50	.0843	.9964	.0846	11.826	10
5° 00′	.0872	.9962	.0875	11.430	85° 00′
10	.0901	.9959	.0904	11.059	50
20	.0929	.9957	.0934	10.712	40
30	.0958	.9954	.0963	10.385	30
40	.0987	.9951	.0992	10.078	20
50	.1016	.9948	.1022	9.7882	10
6° 00′	.1045	.9945	.1051	9.5144	84° 00′
10	.1074	.9942	.1080	9.2553	50
20	.1103	.9939	.1110	9.0098	40
30	.1132	.9936	.1139	8.7769	30
40	.1161	.9932	.1169	8.5555	20
50	.1190	.9929	.1198	8.3450	10
7° 00′	.1219	.9925	.1228	8.1443	83° 00′
10	.1248	.9922	.1257	7.9530	50
20	.1276	.9918	.1287	7.7704	40
30	.1305	.9914	.1317	7.5958	30
40	.1334	.9911	.1346	7.4287	20
50	.1363	.9907	.1376	7.2687	10
8° 00′	.1392	.9903	.1405	7.1154	82° 00′
10	.1421	.9899	.1435	6.9682	50
20	.1449	.9894	.1465	6.8269	40
30	.1478	.9890	.1495	6.6912	30
40	.1507	.9886	.1524	6.5606	20
50	.1536	.9881	.1554	6.4348	10
9° 00′	.1564	.9877	.1584	6.3138	81° 00′
10	.1593	.9872	.1614	6.1970	50
20	.1622	.9868	.1644	6.0844	40
30	.1650	.9863	.1673	5.9758	30
40	.1679	.9858	.1703	5.8708	20
50	.1708	.9853	.1733	5.7694	10
10° 00′	.1736	.9848	.1763	5.6713	80° 00′
10	.1765	.9843	.1793	5.5764	50
20	.1794	.9838	.1823	5.4845	40
30	.1822	.9833	.1853	5.3955	30
40	.1851	.9827	.1883	5.3093	20
50	.1880	.9822	.1914	5.2257	10
11° 00′	.1908	.9816	.1944	5.1446	79° 00′
10	.1937	.9811	.1974	5.0658	50
20	.1965	.9805	.2004	4.9894	40
30	.1994	.9799	.2035	4.9152	30
40	.2022	.9793	.2065	4.8430	20
50	.2051	.9787	.2095	4.7729	10
12° 00′	.2079	.9781	.2126	4.7046	78° 00′
	Cos	Sin	Cot	Tan	Angle

Angle	Sin	Cos	Tan	Cot	
12° 00′	.2079	.9781	.2126	4.7046	78° 00′
10	.2108	.9775	.2156	4.6382	50
20	.2136	.9769	.2186	4.5736	40
30	.2164	.9763	.2217	4.5107	30
40	.2193	.9757	.2247	4.4494	20
50	.2221	.9750	.2278	4.3897	10
13° 00′	.2250	.9744	.2309	4.3315	77° 00′
10	.2278	.9737	.2339	4.2747	50
20	.2306	.9730	.2370	4.2193	40
30	.2334	.9724	.2401	4.1653	30
40	.2363	.9717	.2432	4.1126	20
50	.2391	.9710	.2462	4.0611	10
14° 00′	.2419	.9703	.2493	4.0108	76° 00′
10	.2447	.9696	.2524	3.9617	50
20	.2476	.9689	.2555	3.9136	40
30	.2504	.9681	.2586	3.8667	30
40	.2532	.9674	.2617	3.8208	20
50	.2560	.9667	.2648	3.7760	10
15° 00′	.2588	.9659	.2679	3.7321	75° 00′
10	.2616	.9652	.2711	3.6891	50
20	.2644	.9644	.2742	3.6470	40
30	.2672	.9636	.2773	3.6059	30
40	.2700	.9628	.2805	3.5656	20
50	.2728	.9621	.2836	3.5261	10
16° 00′	.2756	.9613	.2867	3.4874	74° 00′
10	.2784	.9605	.2899	3.4495	50
20	.2812	.9596	.2931	3.4124	40
30	.2840	.9588	.2962	3.3759	30
40	.2868	.9580	.2994	3.3402	20
50	.2896	.9572	.3026	3.3052	10
17° 00′	.2924	.9563	.3057	3.2709	73° 00′
10	.2952	.9555	.3089	3.2371	50
20	.2979	.9546	.3121	3.2041	40
30	.3007	.9537	.3153	3.1716	30
40	.3035	.9528	.3185	3.1397	20
50	.3062	.9520	.3217	3.1084	10
18° 00′	.3090	.9511	.3249	3.0777	72° 00′
10	.3118	.9502	.3281	3.0475	50
20	.3145	.9492	.3314	3.0178	40
30	.3173	.9483	.3346	2.9887	30
40	.3201	.9474	.3378	2.9600	20
50	.3228	.9465	.3411	2.9319	10
19° 00′	.3256	.9455	.3443	2.9042	71° 00′
10	.3283	.9446	.3476	2.8770	50
20	.3311	.9436	.3508	2.8502	40
30	.3338	.9426	.3541	2.8239	30
40	.3365	.9417	.3574	2.7980	20
50	.3393	.9407	.3607	2.7725	10
20° 00′	.3420	.9397	.3640	2.7475	70° 00′
10	.3448	.9387	.3673	2.7228	50
20	.3475	.9377	.3706	2.6985	40
30	.3502	.9367	.3739	2.6746	30
40	.3529	.9356	.3772	2.6511	20
50	.3557	.9346	.3805	2.6279	10
21° 00′	.3584	.9336	.3839	2.6051	69° 00′
10	.3611	.9325	.3872	2.5826	50
20	.3638	.9315	.3906	2.5605	40
30	.3665	.9304	.3939	2.5386	30
40	.3692	.9293	.3973	2.5172	20
50	.3719	.9283	.4006	2.4960	10
22° 00′	.3746	.9272	.4040	2.4751	68° 00′
10	.3773	.9261	.4074	2.4545	50
20	.3800	.9250	.4108	2.4342	40
30	.3827	.9239	.4142	2.4142	30
40	.3854	.9228	.4176	2.3945	20
50	.3881	.9216	.4210	2.3750	10
23° 00′	.3907	.9205	.4245	2.3559	67° 00′
10	.3934	.9194	.4279	2.3369	50
20	.3961	.9182	.4314	2.3183	40
30	.3987	.9171	.4348	2.2998	30
40	.4014	.9159	.4383	2.2817	20
50	.4041	.9147	.4417	2.2637	10
24° 00′	.4067	.9135	.4452	2.2460	66° 00′
	Cos	Sin	Cot	Tan	Angle

Ⓑ Values of Trigonometric Functions

Angle	Sin	Cos	Tan	Cot	
24° 00′	.4067	.9135	.4452	2.2460	66° 00′
10	.4094	.9124	.4487	2.2286	50
20	.4120	.9112	.4522	2.2113	40
30	.4147	.9100	.4557	2.1943	30
40	.4173	.9088	.4592	2.1775	20
50	.4200	.9075	.4628	2.1609	10
25° 00′	.4226	.9063	.4663	2.1445	65° 00′
10	.4253	.9051	.4699	2.1283	50
20	.4279	.9038	.4734	2.1123	40
30	.4305	.9026	.4770	2.0965	30
40	.4331	.9013	.4806	2.0809	20
50	.4358	.9001	.4841	2.0655	10
26° 00′	.4384	.8988	.4877	2.0503	64° 00′
10	.4410	.8975	.4913	2.0353	50
20	.4436	.8962	.4950	2.0204	40
30	.4462	.8949	.4986	2.0057	30
40	.4488	.8936	.5022	1.9912	20
50	.4514	.8923	.5059	1.9768	10
27° 00′	.4540	.8910	.5095	1.9626	63° 00′
10	.4566	.8897	.5132	1.9486	50
20	.4592	.8884	.5169	1.9347	40
30	.4617	.8870	.5206	1.9210	30
40	.4643	.8857	.5243	1.9074	20
50	.4669	.8843	.5280	1.8940	10
28° 00′	.4695	.8829	.5317	1.8807	62° 00′
10	.4720	.8816	.5354	1.8676	50
20	.4746	.8802	.5392	1.8546	40
30	.4772	.8788	.5430	1.8418	30
40	.4797	.8774	.5467	1.8291	20
50	.4823	.8760	.5505	1.8165	10
29° 00′	.4848	.8746	.5543	1.8040	61° 00′
10	.4874	.8732	.5581	1.7917	50
20	.4899	.8718	.5619	1.7796	40
30	.4924	.8704	.5658	1.7675	30
40	.4950	.8689	.5696	1.7556	20
50	.4975	.8675	.5735	1.7437	10
30° 00′	.5000	.8660	.5774	1.7321	60° 00′
10	.5025	.8646	.5812	1.7205	50
20	.5050	.8631	.5851	1.7090	40
30	.5075	.8616	.5890	1.6977	30
40	.5100	.8601	.5930	1.6864	20
50	.5125	.8587	.5969	1.6753	10
31° 00′	.5150	.8572	.6009	1.6643	59° 00′
10	.5175	.8557	.6048	1.6534	50
20	.5200	.8542	.6088	1.6426	40
30	.5225	.8526	.6128	1.6319	30
40	.5250	.8511	.6168	1.6212	20
50	.5275	.8496	.6208	1.6107	10
32° 00′	.5299	.8480	.6249	1.6003	58° 00′
10	.5324	.8465	.6289	1.5900	50
20	.5348	.8450	.6330	1.5798	40
30	.5373	.8434	.6371	1.5697	30
40	.5398	.8418	.6412	1.5597	20
50	.5422	.8403	.6453	1.5497	10
33° 00′	.5446	.8387	.6494	1.5399	57° 00′
10	.5471	.8371	.6536	1.5301	50
20	.5495	.8355	.6577	1.5204	40
30	.5519	.8339	.6619	1.5108	30
40	.5544	.8323	.6661	1.5013	20
50	.5568	.8307	.6703	1.4919	10
34° 00′	.5592	.8290	.6745	1.4826	56° 00′
10	.5616	.8274	.6787	1.4733	50
20	.5640	.8258	.6830	1.4641	40
30	.5664	.8241	.6873	1.4550	30
40	.5688	.8225	.6916	1.4460	20
50	.5712	.8208	.6959	1.4370	10
35° 00′	.5736	.8192	.7002	1.4281	55° 00′
10	.5760	.8175	.7046	1.4193	50
20	.5783	.8158	.7089	1.4106	40
30	.5807	.8141	.7133	1.4019	30
40	.5831	.8124	.7177	1.3934	20
50	.5854	.8107	.7221	1.3848	10
36° 00′	.5878	.8090	.7265	1.3764	54° 00′
	Cos	Sin	Cot	Tan	Angle

Angle	Sin	Cos	Tan	Cot	
36° 00′	.5878	.8090	.7265	1.3764	54° 00′
10	.5901	.8073	.7310	1.3680	50
20	.5925	.8056	.7355	1.3597	40
30	.5948	.8039	.7400	1.3514	30
40	.5972	.8021	.7445	1.3432	20
50	.5995	.8004	.7490	1.3351	10
37° 00′	.6018	.7986	.7536	1.3270	53° 00′
10	.6041	.7969	.7581	1.3190	50
20	.6065	.7951	.7627	1.3111	40
30	.6088	.7934	.7673	1.3032	30
40	.6111	.7916	.7720	1.2954	20
50	.6134	.7898	.7766	1.2876	10
38° 00′	.6157	.7880	.7813	1.2799	52° 00′
10	.6180	.7862	.7860	1.2723	50
20	.6202	.7844	.7907	1.2647	40
30	.6225	.7826	.7954	1.2572	30
40	.6248	.7808	.8002	1.2497	20
50	.6271	.7790	.8050	1.2423	10
39° 00′	.6293	.7771	.8098	1.2349	51° 00′
10	.6316	.7753	.8146	1.2276	50
20	.6338	.7735	.8195	1.2203	40
30	.6361	.7716	.8243	1.2131	30
40	.6383	.7698	.8292	1.2059	20
50	.6406	.7679	.8342	1.1988	10
40° 00′	.6428	.7660	.8391	1.1918	50° 00′
10	.6450	.7642	.8441	1.1847	50
20	.6472	.7623	.8491	1.1778	40
30	.6494	.7604	.8541	1.1708	30
40	.6517	.7585	.8591	1.1640	20
50	.6539	.7566	.8642	1.1571	10
41° 00′	.6561	.7547	.8693	1.1504	49° 00′
10	.6583	.7528	.8744	1.1436	50
20	.6604	.7509	.8796	1.1369	40
30	.6626	.7490	.8847	1.1303	30
40	.6648	.7470	.8899	1.1237	20
50	.6670	.7451	.8952	1.1171	10
42° 00′	.6691	.7431	.9004	1.1106	48° 00′
10	.6713	.7412	.9057	1.1041	50
20	.6734	.7392	.9110	1.0977	40
30	.6756	.7373	.9163	1.0913	30
40	.6777	.7353	.9217	1.0850	20
50	.6799	.7333	.9271	1.0786	10
43° 00′	.6820	.7314	.9325	1.0724	47° 00′
10	.6841	.7294	.9380	1.0661	50
20	.6862	.7274	.9435	1.0599	40
30	.6884	.7254	.9490	1.0538	30
40	.6905	.7234	.9545	1.0477	20
50	.6926	.7214	.9601	1.0416	10
44° 00′	.6947	.7193	.9657	1.0355	46° 00′
10	.6967	.7173	.9713	1.0295	50
20	.6988	.7153	.9770	1.0235	40
30	.7009	.7133	.9827	1.0176	30
40	.7030	.7112	.9884	1.0117	20
50	.7050	.7092	.9942	1.0058	10
45° 00′	.7071	.7071	1.0000	1.0000	45° 00′
	Cos	Sin	Cot	Tan	Angle

© Logarithms of Trigonometric Functions*

Angle	L Sin	L Cos	L Tan	L Cot	
0° 00′	—	10.0000	—	—	90° 00′
10	7.4637	10.0000	7.4637	12.5363	50
20	7.7648	10.0000	7.7648	12.2352	40
30	7.9408	10.0000	7.9409	12.0591	30
40	8.0658	10.0000	8.0658	11.9342	20
50	8.1627	10.0000	8.1627	11.8373	10
1° 00′	8.2419	9.9999	8.2419	11.7581	89° 00′
10	8.3088	9.9999	8.3089	11.6911	50
20	8.3668	9.9999	8.3669	11.6331	40
30	8.4179	9.9999	8.4181	11.5819	30
40	8.4637	9.9998	8.4638	11.5362	20
50	8.5050	9.9998	8.5053	11.4947	10
2° 00′	8.5428	9.9997	8.5431	11.4569	88° 00′
10	8.5776	9.9997	8.5779	11.4221	50
20	8.6097	9.9996	8.6101	11.3899	40
30	8.6397	9.9996	8.6401	11.3599	30
40	8.6677	9.9995	8.6682	11.3318	20
50	8.6940	9.9995	8.6945	11.3055	10
3° 00′	8.7188	9.9994	8.7194	11.2806	87° 00′
10	8.7423	9.9993	8.7429	11.2571	50
20	8.7645	9.9993	8.7652	11.2348	40
30	8.7857	9.9992	8.7865	11.2135	30
40	8.8059	9.9991	8.8067	11.1933	20
50	8.8251	9.9990	8.8261	11.1739	10
4° 00′	8.8436	9.9989	8.8446	11.1554	86° 00′
10	8.8613	9.9989	8.8624	11.1376	50
20	8.8783	9.9988	8.8795	11.1205	40
30	8.8946	9.9987	8.8960	11.1040	30
40	8.9104	9.9986	8.9118	11.0882	20
50	8.9256	9.9985	8.9272	11.0728	10
5° 00′	8.9403	9.9983	8.9420	11.0580	85° 00′
10	8.9545	9.9982	8.9563	11.0437	50
20	8.9682	9.9981	8.9701	11.0299	40
30	8.9816	9.9980	8.9836	11.0164	30
40	8.9945	9.9979	8.9966	11.0034	20
50	9.0070	9.9977	9.0093	10.9907	10
6° 00′	9.0192	9.9976	9.0216	10.9784	84° 00′
10	9.0311	9.9975	9.0336	10.9664	50
20	9.0426	9.9973	9.0453	10.9547	40
30	9.0539	9.9972	9.0567	10.9433	30
40	9.0648	9.9971	9.0678	10.9322	20
50	9.0755	9.9969	9.0786	10.9214	10
7° 00′	9.0859	9.9968	9.0891	10.9109	83° 00′
10	9.0961	9.9966	9.0995	10.9005	50
20	9.1060	9.9964	9.1096	10.8904	40
30	9.1157	9.9963	9.1194	10.8806	30
40	9.1252	9.9961	9.1291	10.8709	20
50	9.1345	9.9959	9.1385	10.8615	10
8° 00′	9.1436	9.9958	9.1478	10.8522	82° 00′
10	9.1525	9.9956	9.1569	10.8431	50
20	9.1612	9.9954	9.1658	10.8342	40
30	9.1697	9.9952	9.1745	10.8255	30
40	9.1781	9.9950	9.1831	10.8169	20
50	9.1863	9.9948	9.1915	10.8085	10
9° 00′	9.1943	9.9946	9.1997	10.8003	81° 00′
10	9.2022	9.9944	9.2078	10.7922	50
20	9.2100	9.9942	9.2158	10.7842	40
30	9.2176	9.9940	9.2236	10.7764	30
40	9.2251	9.9938	9.2313	10.7687	20
50	9.2324	9.9936	9.2389	10.7611	10
10° 00′	9.2397	9.9934	9.2463	10.7537	80° 00′
10	9.2468	9.9931	9.2536	10.7464	50
20	9.2538	9.9929	9.2609	10.7391	40
30	9.2606	9.9927	9.2680	10.7320	30
40	9.2674	9.9924	9.2750	10.7250	20
50	9.2740	9.9922	9.2819	10.7181	10
11° 00′	9.2806	9.9919	9.2887	10.7113	79° 00′
10	9.2870	9.9917	9.2953	10.7047	50
20	9.2934	9.9914	9.3020	10.6980	40
30	9.2997	9.9912	9.3085	10.6915	30
40	9.3058	9.9909	9.3149	10.6851	20
50	9.3119	9.9907	9.3212	10.6788	10
12° 00′	9.3179	9.9904	9.3275	10.6725	78° 00′
	L Cos	L Sin	L Cot	L Tan	Angle

Angle	L Sin	L Cos	L Tan	L Cot	
12° 00′	9.3179	9.9904	9.3275	10.6725	78° 00′
10	9.3238	9.9901	9.3336	10.6664	50
20	9.3296	9.9899	9.3397	10.6603	40
30	9.3353	9.9896	9.3458	10.6542	30
40	9.3410	9.9893	9.3517	10.6483	20
50	9.3466	9.9890	9.3576	10.6424	10
13° 00′	9.3521	9.9887	9.3634	10.6366	77° 00′
10	9.3575	9.9884	9.3691	10.6309	50
20	9.3629	9.9881	9.3748	10.6252	40
30	9.3682	9.9878	9.3804	10.6196	30
40	9.3734	9.9875	9.3859	10.6141	20
50	9.3786	9.9872	9.3914	10.6086	10
14° 00′	9.3837	9.9869	9.3968	10.6032	76° 00′
10	9.3887	9.9866	9.4021	10.5979	50
20	9.3937	9.9863	9.4074	10.5926	40
30	9.3986	9.9859	9.4127	10.5873	30
40	9.4035	9.9856	9.4178	10.5822	20
50	9.4083	9.9853	9.4230	10.5770	10
15° 00′	9.4130	9.9849	9.4281	10.5719	75° 00′
10	9.4177	9.9846	9.4331	10.5669	50
20	9.4223	9.9843	9.4381	10.5619	40
30	9.4269	9.9839	9.4430	10.5570	30
40	9.4314	9.9836	9.4479	10.5521	20
50	9.4359	9.9832	9.4527	10.5473	10
16° 00′	9.4403	9.9828	9.4575	10.5425	74° 00′
10	9.4447	9.9825	9.4622	10.5378	50
20	9.4491	9.9821	9.4669	10.5331	40
30	9.4533	9.9817	9.4716	10.5284	30
40	9.4576	9.9814	9.4762	10.5238	20
50	9.4618	9.9810	9.4808	10.5192	10
17° 00′	9.4659	9.9806	9.4853	10.5147	73° 00′
10	9.4700	9.9802	9.4898	10.5102	50
20	9.4741	9.9798	9.4943	10.5057	40
30	9.4781	9.9794	9.4987	10.5013	30
40	9.4821	9.9790	9.5031	10.4969	20
50	9.4861	9.9786	9.5075	10.4925	10
18° 00′	9.4900	9.9782	9.5118	10.4882	72° 00′
10	9.4939	9.9778	9.5161	10.4839	50
20	9.4977	9.9774	9.5203	10.4797	40
30	9.5015	9.9770	9.5245	10.4755	30
40	9.5052	9.9765	9.5287	10.4713	20
50	9.5090	9.9761	9.5329	10.4671	10
19° 00′	9.5126	9.9757	9.5370	10.4630	71° 00′
10	9.5163	9.9752	9.5411	10.4589	50
20	9.5199	9.9748	9.5451	10.4549	40
30	9.5235	9.9743	9.5491	10.4509	30
40	9.5270	9.9739	9.5531	10.4469	20
50	9.5306	9.9734	9.5571	10.4429	10
20° 00′	9.5341	9.9730	9.5611	10.4389	70° 00′
10	9.5375	9.9725	9.5650	10.4350	50
20	9.5409	9.9721	9.5689	10.4311	40
30	9.5443	9.9716	9.5727	10.4273	30
40	9.5477	9.9711	9.5766	10.4234	20
50	9.5510	9.9706	9.5804	10.4196	10
21° 00′	9.5543	9.9702	9.5842	10.4158	69° 00′
10	9.5576	9.9697	9.5879	10.4121	50
20	9.5609	9.9692	9.5917	10.4083	40
30	9.5641	9.9687	9.5954	10.4046	30
40	9.5673	9.9682	9.5991	10.4009	20
50	9.5704	9.9677	9.6028	10.3972	10
22° 00′	9.5736	9.9672	9.6064	10.3936	68° 00′
10	9.5767	9.9667	9.6100	10.3900	50
20	9.5798	9.9661	9.6136	10.3864	40
30	9.5828	9.9656	9.6172	10.3828	30
40	9.5859	9.9651	9.6208	10.3792	20
50	9.5889	9.9646	9.6243	10.3757	10
23° 00′	9.5919	9.9640	9.6279	10.3721	67° 00′
10	9.5948	9.9635	9.6314	10.3686	50
20	9.5978	9.9629	9.6348	10.3652	40
30	9.6007	9.9624	9.6383	10.3617	30
40	9.6036	9.9618	9.6417	10.3583	20
50	9.6065	9.9613	9.6452	10.3548	10
24° 00′	9.6093	9.9607	9.6486	10.3514	66° 00′
	L Cos	L Sin	L Cot	L Tan	Angle

* These tables give the logarithms increased by 10. Hence in each case 10 should be subtracted.

© Logarithms of Trigonometric Functions*

Angle	L Sin	L Cos	L Tan	L Cot	
24° 00′	9.6093	9.9607	9.6486	10.3514	66° 00′
10	9.6121	9.9602	9.6520	10.3480	50
20	9.6149	9.9596	9.6553	10.3447	40
30	9.6177	9.9590	9.6587	10.3413	30
40	9.6205	9.9584	9.6620	10.3380	20
50	9.6232	9.9579	9.6654	10.3346	10
25° 00′	9.6259	9.9573	9.6687	10.3313	65° 00′
10	9.6286	9.9567	9.6720	10.3280	50
20	9.6313	9.9561	9.6752	10.3248	40
30	9.6340	9.9555	9.6785	10.3215	30
40	9.6366	9.9549	9.6817	10.3183	20
50	9.6392	9.9543	9.6850	10.3150	10
26° 00′	9.6418	9.9537	9.6882	10.3118	64° 00′
10	9.6444	9.9530	9.6914	10.3086	50
20	9.6470	9.9524	9.6946	10.3054	40
30	9.6495	9.9518	9.6977	10.3023	30
40	9.6521	9.9512	9.7009	10.2991	20
50	9.6546	9.9505	9.7040	10.2960	10
27° 00′	9.6570	9.9499	9.7072	10.2928	63° 00′
10	9.6595	9.9492	9.7103	10.2897	50
20	9.6620	9.9486	9.7134	10.2866	40
30	9.6644	9.9479	9.7165	10.2835	30
40	9.6668	9.9473	9.7196	10.2804	20
50	9.6692	9.9466	9.7226	10.2774	10
28° 00′	9.6716	9.9459	9.7257	10.2743	62° 00′
10	9.6740	9.9453	9.7287	10.2713	50
20	9.6763	9.9446	9.7317	10.2683	40
30	9.6787	9.9439	9.7348	10.2652	30
40	9.6810	9.9432	9.7378	10.2622	20
50	9.6833	9.9425	9.7408	10.2592	10
29° 00′	9.6856	9.9418	9.7438	10.2562	61° 00′
10	9.6878	9.9411	9.7467	10.2533	50
20	9.6901	9.9404	9.7497	10.2503	40
30	9.6923	9.9397	9.7526	10.2474	30
40	9.6946	9.9390	9.7556	10.2444	20
50	9.6968	9.9383	9.7585	10.2415	10
30° 00′	9.6990	9.9375	9.7614	10.2386	60° 00′
10	9.7012	9.9368	9.7644	10.2356	50
20	9.7033	9.9361	9.7673	10.2327	40
30	9.7055	9.9353	9.7701	10.2299	30
40	9.7076	9.9346	9.7730	10.2270	20
50	9.7097	9.9338	9.7759	10.2241	10
31° 00′	9.7118	9.9331	9.7788	10.2212	59° 00′
10	9.7139	9.9323	9.7816	10.2184	50
20	9.7160	9.9315	9.7845	10.2155	40
30	9.7181	9.9308	9.7873	10.2127	30
40	9.7201	9.9300	9.7902	10.2098	20
50	9.7222	9.9292	9.7930	10.2070	10
32° 00′	9.7242	9.9284	9.7958	10.2042	58° 00′
10	9.7262	9.9276	9.7986	10.2014	50
20	9.7282	9.9268	9.8014	10.1986	40
30	9.7302	9.9260	9.8042	10.1958	30
40	9.7322	9.9252	9.8070	10.1930	20
50	9.7342	9.9244	9.8097	10.1903	10
33° 00′	9.7361	9.9236	9.8125	10.1875	57° 00′
10	9.7380	9.9228	9.8153	10.1847	50
20	9.7400	9.9219	9.8180	10.1820	40
30	9.7419	9.9211	9.8208	10.1792	30
40	9.7438	9.9203	9.8235	10.1765	20
50	9.7457	9.9194	9.8263	10.1737	10
34° 00′	9.7476	9.9186	9.8290	10.1710	56° 00′
10	9.7494	9.9177	9.8317	10.1683	50
20	9.7513	9.9169	9.8344	10.1656	40
30	9.7531	9.9160	9.8371	10.1629	30
40	9.7550	9.9151	9.8398	10.1602	20
50	9.7568	9.9142	9.8425	10.1575	10
35° 00′	9.7586	9.9134	9.8452	10.1548	55° 00′
10	9.7604	9.9125	9.8479	10.1521	50
20	9.7622	9.9116	9.8506	10.1494	40
30	9.7640	9.9107	9.8533	10.1467	30
40	9.7657	9.9098	9.8559	10.1441	20
50	9.7675	9.9089	9.8586	10.1414	10
36° 00′	9.7692	9.9080	9.8613	10.1387	54° 00′
	L Cos	L Sin	L Cot	L Tan	Angle

Angle	L Sin	L Cos	L Tan	L Cot	
36° 00′	9.7692	9.9080	9.8613	10.1387	54° 00′
10	9.7710	9.9070	9.8639	10.1361	50
20	9.7727	9.9061	9.8666	10.1334	40
30	9.7744	9.9052	9.8692	10.1308	30
40	9.7761	9.9042	9.8718	10.1282	20
50	9.7778	9.9033	9.8745	10.1255	10
37° 00′	9.7795	9.9023	9.8771	10.1229	53° 00′
10	9.7811	9.9014	9.8797	10.1203	50
20	9.7828	9.9004	9.8824	10.1176	40
30	9.7844	9.8995	9.8850	10.1150	30
40	9.7861	9.8985	9.8876	10.1124	20
50	9.7877	9.8975	9.8902	10.1098	10
38° 00′	9.7893	9.8965	9.8928	10.1072	52° 00′
10	9.7910	9.8955	9.8954	10.1046	50
20	9.7926	9.8945	9.8980	10.1020	40
30	9.7941	9.8935	9.9006	10.0994	30
40	9.7957	9.8925	9.9032	10.0968	20
50	9.7973	9.8915	9.9058	10.0942	10
39° 00′	9.7989	9.8905	9.9084	10.0916	51° 00′
10	9.8004	9.8895	9.9110	10.0890	50
20	9.8020	9.8884	9.9135	10.0865	40
30	9.8035	9.8874	9.9161	10.0839	30
40	9.8050	9.8864	9.9187	10.0813	20
50	9.8066	9.8853	9.9212	10.0788	10
40° 00′	9.8081	9.8843	9.9238	10.0762	50° 00′
10	9.8096	9.8832	9.9264	10.0736	50
20	9.8111	9.8821	9.9289	10.0711	40
30	9.8125	9.8810	9.9315	10.0685	30
40	9.8140	9.8800	9.9341	10.0659	20
50	9.8155	9.8789	9.9366	10.0634	10
41° 00′	9.8169	9.8778	9.9392	10.0608	49° 00′
10	9.8184	9.8767	9.9417	10.0583	50
20	9.8198	9.8756	9.9443	10.0557	40
30	9.8213	9.8745	9.9468	10.0532	30
40	9.8227	9.8733	9.9494	10.0506	20
50	9.8241	9.8722	9.9519	10.0481	10
42° 00′	9.8255	9.8711	9.9544	10.0456	48° 00′
10	9.8269	9.8699	9.9570	10.0430	50
20	9.8283	9.8688	9.9595	10.0405	40
30	9.8297	9.8676	9.9621	10.0379	30
40	9.8311	9.8665	9.9646	10.0354	20
50	9.8324	9.8653	9.9671	10.0329	10
43° 00′	9.8338	9.8641	9.9697	10.0303	47° 00′
10	9.8351	9.8629	9.9722	10.0278	50
20	9.8365	9.8618	9.9747	10.0253	40
30	9.8378	9.8606	9.9772	10.0228	30
40	9.8391	9.8594	9.9798	10.0202	20
50	9.8405	9.8582	9.9823	10.0177	10
44° 00′	9.8418	9.8569	9.9848	10.0152	46° 00′
10	9.8431	9.8557	9.9874	10.0126	50
20	9.8444	9.8545	9.9899	10.0101	40
30	9.8457	9.8532	9.9924	10.0076	30
40	9.8469	9.8520	9.9949	10.0051	20
50	9.8482	9.8507	9.9975	10.0025	10
45° 00′	9.8495	9.8495	10.0000	10.0000	45° 00′
	L Cos	L Sin	L Cot	L Tan	Angle

* These tables give the logarithms increased by 10. Hence in each case 10 should be subtracted.

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH — COURSE III

Friday, January 27, 1984 — 9:15 a.m. to 12:15 p.m., only

Part I Score: .....
Rater's Initials:
.....

ANSWER SHEET

Pupil ..... Teacher .....

School ..... Grade .....

Your answers to Part I should be recorded on this answer sheet.

Part I

Answer 30 questions from this part.

1	11	21	31 .....
2	12	22	32 .....
3	13	23	33 .....
4	14	24	34 .....
5	15	25	35 .....
6	16	26	
7	17	27	
8	18	28	
9	19	29	
10	20	30	

Your answers for Part II should be placed on paper provided by the school.

The declaration below should be signed when you have completed the examination.

I do hereby affirm, at the close of this examination, that I had no unlawful knowledge of the questions or answers prior to the examination, and that I have neither given nor received assistance in answering any of the questions during the examination.

Signature

FOR TEACHERS ONLY

SCORING KEY

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE III

Friday, January 27, 1984 — 9:15 a.m. to 12:15 p.m., only

Use only *red* ink or *red* pencil in rating Regents papers. Do not attempt to *correct* the pupil's work by making insertions or changes of any kind. Use checkmarks to indicate pupil errors.

Unless otherwise specified, mathematically correct variations in the answers will be allowed. Units need not be given when the wording of the questions allows such omissions.

Part I

Allow a total of 60 credits, 2 credits for each of 30 of the following. [If more than 30 are answered, only the first 30 answered should be considered.] Allow no partial credit. For questions 19–35, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) $\frac{13\pi}{9}$

(2) $\frac{3}{4}$

(3) $\frac{17}{4}$

(4) $x + 1$

(5) 7

(6) $-\cos 40°$ *or* $-\sin 50°$

(7) 27

(8) 15

(9) 4

(10) 80

(11) -2

(12) 1.7666

(13) E

(14) 10

(15) 2

(16) $17i$

(17) $\frac{4}{3}$

(18) 8

(19) 4

(20) 2

(21) 1

(22) 3

(23) 1

(24) 2

(25) 1

(26) 2

(27) 3

(28) 2

(29) 1

(30) 4

(31) 3

(32) 1

(33) 3

(34) 4

(35) 4

[OVER]

Part II

Please refer to the Department's pamphlet *Suggestions on the Rating of Regents Examination Papers in Mathematics.* Care should be exercised in making deductions as to whether the error is purely a mechanical one or due to a violation of some principle. A mechanical error generally should receive a deduction of 10 percent, while an error due to a violation of some cardinal principle should receive a deduction ranging from 30 percent to 50 percent, depending on the relative importance of the principle in the solution of the problem.

(36) *b* 1 [2]

(37) *a* 40 [2]
b 80 [2]
c 110 [2]
d 60 [2]
e 50 [2]

(38) *a* 8 [6]
b 39.8 [4]

(39) *a* 1.7 [5]
b $\frac{2}{a-1}$ [5]

(40) *a* $A'(1,-1)$, $B'(5,-1)$, $C'(4,-3)$ [3]
b $A''(-5,7)$, $B''(-1,7)$, $C''(-2,9)$ [2]
c $A'''(-2,-2)$, $B'''(-10,-2)$, $C'''(-8,-6)$ [3]
d *W* [1]
e *T* [1]

(41) *a* 60 [3]
b 5.6 [7]

(42) *a* 60°, 180°, 300° [5]