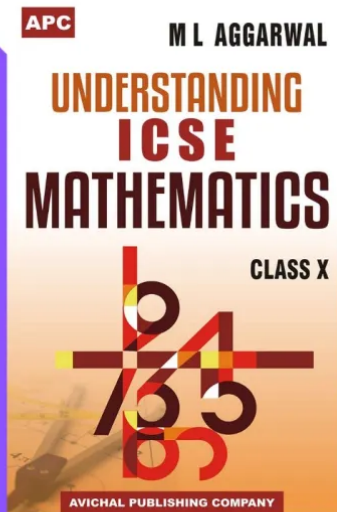


ML Aggarwal Solutions for Class 10 Maths Chapter 19- Trigonometric Tables



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ML Agrawal Solutions

CLASS 10 MATHS

Chapter 19: Trigonometric Tables

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Chapter 19- Trigonometric Tables

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ML Aggarwal Solutions for Class 10 Maths Chapter 19- Trigonometric Tables

ML Aggarwal 10th Maths Chapter 19, Class 10 Maths Chapter 19 solutions

Exercise 19

1. Find the value of the following:

(i) $\sin 35^\circ 22'$

Solution:-

To find the value of $\sin 35^\circ 22'$,

We read the table of natural sines in the horizontal line which begins with 35°

In the vertical column headed by $22'$ i.e. $22' - 18' = 4'$ in the difference column, the value of $4'$ in mean difference column is 10.

Then, value that we find in vertical column is 0.5779

Now adding the value of $18'$ and $4' = 0.5779 + 10$

$= 0.5789$

Therefore, the value of $\sin 35^\circ 22'$ is obtained as under,

$\sin 35^\circ 22' = 0.5779 \dots$ [from table]

Mean difference for $4' = 10 \dots$ [to be added]

Then, $\sin 35^\circ 22' = 0.5789$

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(ii) $\sin 71^\circ 31'$ **Solution:-**

To find the value of $\sin 71^\circ 31'$,

We read the table of natural sines in the horizontal line which begins with 35°

In the vertical column headed by $31'$ i.e. $31' - 30' = 1'$ in the difference column, the value of $1'$ in mean difference column is 1.

Then, value that we find in vertical column is 0.9483

Now adding the value of $30'$ and $1' = 0.9483 + 1$

$= 0.9484$

Therefore, the value of $\sin 71^\circ 31'$ is obtained as under,

$\sin 71^\circ 31' = 0.9483 \dots$ [from table]

Mean difference for $1' = 1 \dots$ [to be added]

Then, $\sin 71^\circ 31' = 0.9484$

(iii) $\sin 65^\circ 20'$ **Solution:-**

To find the value of $\sin 65^\circ 20'$,

We read the table of natural sines in the horizontal line which begins with 35°

In the vertical column headed by $20'$ i.e. $20' - 18' = 2'$ in the difference column, the value of $2'$ in mean difference column is 2.

Then, value that we find in vertical column is 0.9085

Now adding the value of $18'$ and $2' = 0.9085 + 2$

$= 0.9087$

Therefore, the value of $\sin 65^\circ 20'$ is obtained as under,

$\sin 65^\circ 20' = 0.9085 \dots$ [from table]

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Mean difference for $2' = 2 \dots$ [to be added]

Then, $\sin 65^\circ 20' = 0.9087$

(iv) $\sin 23^\circ 56'$

Solution:-

To find the value of $\sin 23^\circ 56'$,

We read the table of natural sines in the horizontal line which begins with 23°

In the vertical column headed by $56'$ i.e. $56' - 54' = 2'$ in the difference column, the value of $2'$ in mean difference column is 5.

Then, value that we find in vertical column is 0.4051

Now adding the value of $54'$ and $4' = 0.4051 + 5$

$= 0.4056$

Therefore, the value of $\sin 23^\circ 56'$ is obtained as under,

$\sin 23^\circ 56' = 0.4051 \dots$ [from table]

Mean difference for $2' = 5 \dots$ [to be added]

Then, $\sin 23^\circ 56' = 0.4056$

2. Find the value of the following:

(i) $\cos 62^\circ 27'$

Solution:-

We know that as θ increase, the value of $\cos \theta$ decreases, therefore, the numbers in the mean difference columns are to be subtracted.

To find the value of $\cos 62^\circ 27'$,

We read the table of natural sines in the horizontal line which begins with 62°

In the vertical column headed by $27'$ i.e. $27' - 24' = 3'$ in the difference column, the value of $3'$ in mean difference column is 8.

Then, value that we find in vertical column is 0.4633

Now adding the value of $24'$ and $3' = 0.4633 - 8$

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$$= 0.4625$$

Therefore, $\cos 62^\circ 27'$ is 0.4625.

(ii) $\cos 3^\circ 11'$

Solution:-

We know that as θ increase, the value of $\cos \theta$ decreases, therefore, the numbers in the mean difference columns are to be subtracted.

To find the value of $\cos 3^\circ 11'$,

We read the table of natural sines in the horizontal line which begins with 3°

In the vertical column headed by $27'$ i.e. $11' - 6' = 5'$ in the difference column, the value of $5'$ in mean difference column is 1.

Then, value that we find in vertical column is 0.9985

Now adding the value of $6'$ and $5' = 0.9985 - 1$

$$= 0.9984$$

Therefore, $\cos 3^\circ 11'$ is 0.9984.

(iii) $\cos 86^\circ 40'$

Solution:-

We know that as θ increase, the value of $\cos \theta$ decreases, therefore, the numbers in the mean difference columns are to be subtracted.

To find the value of $\cos 86^\circ 40'$,

We read the table of natural sines in the horizontal line which begins with 86°

In the vertical column headed by $40'$ i.e. $40' - 36' = 4'$ in the difference column, the value of $4'$ in mean difference column is 12.

Then, value that we find in vertical column is 0.0593

Now adding the value of $36'$ and $4' = 0.0593 - 12$

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$$= 0.0581$$

Therefore, $\cos 86^\circ 40'$ is 0.0581.

(iv) $\cos 45^\circ 58'$.

Solution:-

We know that as θ increase, the value of $\cos \theta$ decreases, therefore, the numbers in the mean difference columns are to be subtracted.

To find the value of $\cos 45^\circ 58'$,

We read the table of natural sines in the horizontal line which begins with 45°

In the vertical column headed by $58'$ i.e. $58' - 54' = 4'$ in the difference column, the value of $4'$ in mean difference column is 8.

Then, value that we find in vertical column is 0.6959

Now adding the value of $54'$ and $4' = 0.6959 - 8$

$$= 0.6951$$

Therefore, $\cos 45^\circ 58'$ is 0.6951.

3. Find the value of the following :

(i) $\tan 15^\circ 2'$

Solution:-

To find the value of $\tan 15^\circ 2'$,

We read the table of natural sines in the horizontal line which begins with 15°

In the vertical column headed by $2'$, the value of $2'$ in mean difference column is 6.

Then, value that we find in vertical column is 0.2679

Now adding the values $= 0.2685 + 6$

$$= 0.2685$$

Therefore, $\tan 15^\circ 2'$ is 0.2685.

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(ii) $\tan 53^\circ 14'$

Solution:-

To find the value of $\tan 53^\circ 14'$,

We read the table of natural sines in the horizontal line which begins with 53°

In the vertical column headed by $14'$ i.e. $14' - 12' = 2'$ in the difference column, the value of $2'$ in mean difference column is 16.

Then, value that we find in vertical column is 1.3367

Now adding the value of $12'$ and $2' = 1.3367 + 16$

$= 1.3383$

Therefore, $\tan 53^\circ 14'$ is 1.3383.

(iii) $\tan 82^\circ 18'$

Solution:-

To find the value of $\tan 82^\circ 18'$,

We read the table of natural sines in the horizontal line which begins with 82°

Then, value that we find in vertical column is 7.3962

Therefore, $\tan 82^\circ 18'$ is 7.3962

(iv) $\tan 6^\circ 9'$

Solution:-

To find the value of $\tan 6^\circ 9'$,

We read the table of natural sines in the horizontal line which begins with 6°

In the vertical column headed by $9'$ i.e. $9' - 6' = 3'$ in the difference column, the value of $3'$ in mean difference column is 9.

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Then, value that we find in vertical column is 0.1069

Now adding the value of 6' and 3' = 0.1069 + 9

= 0.1078

Therefore, $\tan 6^\circ 9'$ is 0.1078.

4. Use tables to find the acute angle θ , given that:

(i) $\sin \theta = .5789$

Solution:-

In the table of natural sines, look for a value ($\leq .5789$) which is sufficiently close to .5789.

We find the value .5779 occurs in the horizontal line beginning with 35° and in the column headed by 18' and in the mean difference, we see $.5789 - .5779 = .0010$ in the column of 4'.

So we get, $\theta = 35^\circ 18' + 4' = 35^\circ 22'$.

(ii) $\sin \theta = .9484$

Solution:-

In the table of natural sines, look for a value ($\leq .9484$) which is sufficiently close to .9484.

We find the value .9483 occurs in the horizontal line beginning with 71° and in the column headed by 30' and in the mean difference, we see $.9484 - .9483 = .0001$ in the column of 1'.

So we get, $\theta = 71^\circ 30' + 1' = 71^\circ 31'$.

(iii) $\sin \theta = .2357$

Solution:-

In the table of natural sines, look for a value ($\leq .2357$) which is sufficiently close to .2357.

We find the value .2351 occurs in the horizontal line beginning with 13° and in the column headed by 36' and in the mean difference, we see $.2357 - .2351 = .0006$ in the column of 2'.

So we get, $\theta = 13^\circ 36' + 2' = 13^\circ 38'$.

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(iv) $\sin \theta = .6371$.

Solution:-

In the table of natural sines, look for a value ($\leq .6371$) which is sufficiently close to .6371.

We find the value .6361 occurs in the horizontal line beginning with 39° and in the column headed by $30'$ and in the mean difference, we see $.6371 - .6361 = .0010$ in the column of $4'$.

So we get, $\theta = 39^\circ 30' + 4' = 39^\circ 34'$.

5. Use the tables to find the acute angle θ , given that:

(i) $\cos \theta = .4625$

Solution:-

In the table of cosines, look for a value ($\leq .4625$) which is sufficiently close to .4625.

We find the value .4617 occurs in the horizontal line beginning with 62° and in the column headed by $30'$ and in the mean difference, we see $.4625 - .4617 = .0008$ in the column of $3'$.

So we get, $\theta = 62^\circ 30' - 3' = 62^\circ 27'$.

(ii) $\cos \theta = .9906$

Solution:-

In the table of cosines, look for a value ($\leq .9906$) which is sufficiently close to .9906.

We find the value .9905 occurs in the horizontal line beginning with 7° and in the column headed by $54'$ and in the mean difference, we see $.9906 - .9905 = .0001$ in the column of $3'$.

So we get, $\theta = 70^\circ 54' - 3' = 70^\circ 51'$.

(iii) $\cos \theta = .6951$

Solution:-

In the table of cosines, look for a value ($\leq .6951$) which is sufficiently close to .6951.

We find the value .6947 occurs in the horizontal line beginning with 46° and in the mean difference, we see $.6951 - .6947 = .0004$ in the column of $2'$.

So we get, $\theta = 46^\circ - 2' = 45^\circ 58'$.

(iv) $\cos \theta = .3412$.

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Solution:-

In the table of cosines, look for a value ($\leq .3412$) which is sufficiently close to .3412.

We find the value .3404 occurs in the horizontal line beginning with 70° and in the column headed by $6'$ and in the mean difference, we see $.3412 - .3404 = .0008$ in the column of $3'$.

So we get, $\theta = 70^\circ 6' - 3' = 70^\circ 3'$.

6. Use tables to find the acute angle θ , given that:

(i) $\tan \theta = .2685$

Solution:-

In the table of natural tangent, look for a value ($\leq .2685$) which is sufficiently close to .2685.

We find the value .2679 occurs in the horizontal line beginning with 15° and in the mean difference, we see $.2685 - .2679 = .0006$ in the column of $2'$.

So we get, $\theta = 15^\circ + 2' = 15^\circ 2'$.

(ii) $\tan \theta = 1.7451$

Solution:-

In the table of natural tangent, look for a value (≤ 1.7451) which is sufficiently close to 1.7451.

We find the value 1.7391 occurs in the horizontal line beginning with 60° and in the column headed by $6'$ and in the mean difference, we see $1.7451 - 1.7391 = .0060$ in the column of $5'$.

So we get, $\theta = 60^\circ 6' + 5' = 60^\circ 11'$.

(iii) $\tan \theta = 3.1749$

Solution:-

In the table of natural tangent, look for a value (≤ 3.1749) which is sufficiently close to 3.1749.

We find the value 3.1716 occurs in the horizontal line beginning with 72° and in the column headed by $30'$ and in the mean difference, we see $3.1749 - 3.1716 = .0033$ in the column of $1'$.

So we get, $\theta = 72^\circ 30' + 1' = 72^\circ 31'$.

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(iv) $\tan \theta = .9347$

Solution:-

In the table of natural tangent, look for a value ($\leq .9347$) which is sufficiently close to .9347.

We find the value .9325 occurs in the horizontal line beginning with 43° and in the mean difference, we see $.9347 - .9325 = .0022$ in the column of 4'.

So we get, $\theta = 43^\circ + 4' = 43^\circ 4'$.

7. Using trigonometric table, find the measure of the angle A when $\sin A = 0.1822$.

Solution:-

In the table of natural sines, look for a value (≤ 0.1822) which is sufficiently close to 0.1822.

We find the value 0.1822 occurs in the horizontal line beginning with 10° and in the column headed by 30'.

So we get, $A = 10^\circ 30'$.

8. Using tables, find the value of $2 \sin \theta - \cos \theta$ when (i) $\theta = 35^\circ$ (ii) $\tan \theta = .2679$.

Solution:-

(i) We have to find the value of $2 \sin \theta - \cos \theta$

From the question it is given that, value of $\theta = 35^\circ$

So, substitute the value of θ ,

$$= 2 \sin 35^\circ - \cos 35^\circ$$

From the table value of $\sin 35^\circ = .5736$ and $\cos 35^\circ = .8192$

$$= (2 \times .5736) - .8192$$

$$= 0.3280$$

(ii) from the question it is given that, $\tan \theta = .2679$

In the table of natural sines, look for a value ($\leq .2679$) which is sufficiently close to .2679.

We find the value column headed by 15° .

So we get, $\theta = 15^\circ$

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So, substitute the value of θ ,

$$= 2 \sin 15^\circ - \cos 15^\circ$$

From the table value of $\sin 15^\circ = .2588$ and $\cos 15^\circ = .9659$

$$= (2 \times .2588) - .9659$$

$$= -0.4483$$

9. If $\sin x^\circ = 0.67$, find the value of (i) $\cos x^\circ$ (ii) $\cos x^\circ + \tan x^\circ$.

Solution:-

From the question it is given that, $\sin x^\circ = 0.67$.

In the table of natural sines, look for a value (≤ 0.67) which is sufficiently close to 0.67.

We find the value 0.6691 occurs in the horizontal line beginning with 42° and in the mean difference, we see $0.6700 - 0.6691 = .0009$ in the column of $4'$.

So we get, $\theta = 42^\circ + 4' = 42^\circ 4'$.

Then,

$$(i) \cos x^\circ = \cos 42^\circ 4'$$

From the table

$$= .7431 - .0008$$

$$= 0.7423$$

$$(ii) \cos x^\circ + \tan x^\circ = \cos 42^\circ 4' + \tan 42^\circ 4'$$

$$= 0.7423 + .9025$$

$$= 1.6448$$

10. If θ is acute and $\cos \theta = .7258$, find the value of (i) θ (ii) $2 \tan \theta - \sin \theta$.

Solution:-

From the question, $\cos \theta = .7258$

In the table of cosines, look for a value ($\leq .7258$) which is sufficiently close to .7258.

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We find the value .7254 occurs in the horizontal line beginning with 43° and in the column headed by $30'$ and in the mean difference, we see $.7258 - .7254 = .0004$ in the column of $2'$.

So we get, $\theta = 43^\circ 30' - 2' = 43^\circ 28'$.

$$(i) \theta = 43^\circ 30' - 2'$$

$$= 43^\circ 28'$$

$$(ii) 2 \tan \theta - \sin \theta$$

Substitute the value θ ,

$$= 2 \tan 43^\circ 28' - \sin 43^\circ 28'$$

$$= 2 (.9479) - .6879$$

$$= 1.8958 - .6879$$

$$= 1.2079$$

Therefore, the value of $2 \tan \theta - \sin \theta$ is 1.2079



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About ML Aggarwal

M. L. Aggarwal, is an Indian mechanical engineer, educator. His achievements include research in solutions of industrial problems related to fatigue design. Recipient Best Paper award, Manipal Institute of Technology, 2004. Member of TSTE.

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