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Explanation of the Sine and the Cosine terms

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The solution to calculate the constant (value) is through the sine compare with the solution of the triangle.

If you choose another triangle for calculation, you have to find the angle constant first.

Circumference and area calculation:

Step 1: Choose angle 9°

Step 2: Sine of angle 9° multiplied by 40.

Step 3: The product divided by 2 gives 3.128689301.

Step 4: Divide the angle $9^\circ / 2 = 4.5^\circ$

Step 5: Sine 4.5° multiplied 80 and the product divided by 2 gives 3.138363829.

Note:

1. The sine of the first chosen angle is multiplied 40 and the product is divided by 2.
2. The first angle is divided by 2 and the sine of the angle is multiplied by $(40*2) = 80$ and the product is again divided by 2, see below!

Start constant is 9°

value or constant

01. Sine 9° $= 0.156434465 * (40/2) = 3.128689301$

02. Sine 4.5° $= 0.7845909 * (80/2) = 3.138363829$

03. Sine 2.25° $= 0.0392598158 * (160/2) = 3.140785261$

04. Sine 1.125° = $0.0196336925 * (320/2) = 3.141390794$
05. Sine 0.5625° = $0.0098173193 * (640/2) = 3.141542188$
06. Sine 0.28125° = $0.0049087188 * (1280/2) = 3.141580037$
07. Sine 0.140625° = $0.0024543668 * (2560/2) = 3.141589499$
08. Sine 0.0703125° = $0.0012271843 * (5120/2) = 3.141591865$
09. Sine 0.03515625° = $0.0006135922767 * (10240/2) = 3.141592456$
09. Sine 0.03515625° = $6.135922767_E^{-4} * (10240/2) = 3.141592456$
10. Sine 0.17578125° = $0.0003067961528 * (20480/2) = 3.141592604$
10. Sine 0.017578125° = $3.067961528_E^{-4} * (20480/2) = 3.141592604$
11. Sine 0.0087890625° = $0.0001533980782 * (40960/2) = 3.141592641$
11. Sine 0.0087890625° = $1.533980782_E^{-4} * (40960/2) = 3.141592641$
12. Sine 0.00439453125° = $0.00007669903932 * (81920/2) = 3.141592651$
12. Sine 0.00439453125° = $7.669903932_E^{-5} * (81920/2) = 3.141592651$
13. Sine 0.00219726563° = $0.00003834951969 * (163840/2) = 3.141592653...$
13. Sine 0.00219726563° = $3.834951969_E^{-5} * (163840/2) = 3.141592653...$
14. Sine 0.00109863281° = $0.00001917475985 * (327680/2) = 3.1415926535...$
14. Sine 0.00109863281° = $1.917475985_E^{-5} * (327680/2) = 3.1415926535...$
15. Sine 0.0005493164063° = $0.00009587379924 * (655360/2) = 3.14159265358...$
15. Sine $5.493164063^\circ_E^{-4}$ = $9.587379924_E^{-5} * (327680) = 3.14159265358...$
16. Sine 0.0002746582031° = $0.000004793689962 * 1310720/2) = 3.141592653589...$
16. Sine $2.746582031^\circ_E^{-4}$ = $4.793689962_E^{-6} * (655360) = 3.141592653589...$
17. Sine $1.373291016^\circ_E^{-4}$ = ... $* (2621440/2) = 3.1415926535897...$
18. Sine $6.866455078^\circ_E^{-5}$ = ... $* (5242880/2) = 3.14159265358979...$
19. Sine $3.433227539^\circ_E^{-5}$ = ... $* (10485760/2) = 3.141592653589793...$
20. Sine $1.71661377^\circ_E^{-5}$ = ... $* (20971520/2) = 3.1415926535897932...$
21. Sine $8.583068848^\circ_E^{-6}$ = ... $* (41943040/2) = 3.14159265358979323...$
22. Sine $4.291534424^\circ_E^{-6}$ = ... $* (83886080/2) = 3.141592653589793238...$
23. Sine $2.145767212^\circ_E^{-6}$ = ... $* (167772160/2) = 3.1415926535897932384...$
24. Sine $1.072883606^\circ_E^{-6}$ = ... $* (335544320/2) = 3.14159265358979323846...$
25. Sine $5.36441803^\circ_E^{-7}$ = ... $* (671088640/2) = 3.141592653589793238462...$

26. Sine $2.682209015^{\circ} E^{-7}$ = ... * (1342177280/2) = 3.1415926535897932384626...
27. Sine $1.341104507^{\circ} E^{-7}$ = ... * (2684354560/2) = 3.14159265358979323846264...
28. Sine $6.705522537^{\circ} E^{-8}$ = ... * (5368709120/2) = 3.141592653589793238462643...
29. Sine $3.352761269^{\circ} E^{-8}$ = * (1.073741824 E^{10} /2) = 3.1415926535897932384626433...
30. Sine $1.676380634^{\circ} E^{-8}$ = * (2.147483648 E^{10} /2) = 3.14159265358979323846264338...
31. Sine $8.381903172^{\circ} E^{-9}$ = * (4.294967296 E^{10} /2) = 3.141592653589793238462643383...
32. Sine $4.190951586^{\circ} E^{-9}$ = * (8.589934592 E^{10} /2) = 3.1415926535897932384626433832...
33. Sine $2.095475793^{\circ} E^{-9}$ = * (1.717986918 E^{11} /2) = 3.14159265358979323846264338327...
34. Sine $1.047737896^{\circ} E^{-9}$ = * (3.435973837 E^{11} /2) = 3.141592653589793238462643383279...
35. Sine $5.23868948^{\circ} E^{-10}$ = * (6.871947674 E^{11} /2) = 3.1415926535897932384626433832795...
36. Sine $2.619344474^{\circ} E^{-10}$ = ... * (1.374389535 E^{12} /2) = 3.141592653...
37. Sine $1.30967237^{\circ} E^{-10}$ = ... * (2.748779069 E^{12} /2) = 3.141592653...
38. Sine $6.54836185^{\circ} E^{-11}$ = ... * (5.497558139 E^{12} /2) = 3.141592653...
39. Sine $3.27418093^{\circ} E^{-11}$ = ... * (1.099511628 E^{13} /2) = 3.141592653...
40. Sine $1.63709046^{\circ} E^{-11}$ = ... * (2.199023256 E^{13} /2) = 3.141592653...
41. Sine $8.18545232^{\circ} E^{-12}$ = ... * (4.398046511 E^{13} /2) = 3.141592653...
42. Sine $4.09272616^{\circ} E^{-12}$ = ... * (8.796093022 E^{13} /2) = 3.141592653...
43. Sine $2.04636308^{\circ} E^{-12}$ = ... * (1.759218604 E^{14} /2) = 3.141592653...
44. Sine $1.02318154^{\circ} E^{-12}$ = ... * (3.518437209 E^{14} /2) = 3.141592653...
45. Sine $5.1159077^{\circ} E^{-13}$ = ... * (7.036874418 E^{14} /2) = 3.141592653...
46. Sine $2.55795385^{\circ} E^{-13}$ = 4.46447168 E^{-15} * (1.407374884 E^{15} /2) = 3.141592653...
47. Sine $1.27897692^{\circ} E^{-13}$ = 2.23223584 E^{-15} * (2.814749768 E^{15} /2) = 3.141592653...
48. Sine ... =... * ... = ...
49. Sine ... =... * ... = ...
50. Sine ... =... * ... = ...
51. Sine ... =... * ... = ...
52. Sine ... =... * ... = ...
53. Sine ... =... * ... = ...
54. Sine ... =... * ... = ...
55. Sine ... =... * ... = ...
- = ...
- = ...
- = ...

The solution to calculate the constant of height is through the cosine and not through the triangle.

The cosine always presents a percentage of the radius which also is the height at the triangle.

- 01. Cosine 9° = 0.9876883506
- 02. Cosine 4.5° = 0.9969173337
- 03. Cosine 2.25° = 0.9992290362
- 04. Cosine 1.125° = 0.9998072405
- 05. Cosine 0.5625° = 0.999951809
- 06. Cosine 0.28125° = 0.9999879522
- 07. Cosine 0.140625° = 0.999996988
- 08. Cosine 0.0703125° = 0.999999247
- 09. Cosine 0.03515625° = 0.9999998118
- 10. Cosine 0.017578125° = 0.9999999529
- 11. Cosine 0.0087890625° = 0.9999999882
- 12. Cosine 0.0043945313° = 0.9999999971
- 13. Cosine 0.0021972656° = 0.9999999993
- 14. Cosine 0.0010986328° = 0.9999999998
- 15. Cosine 0.0005493164063° = ...
- 15. Cosine $5.493164063 \times 10^{-4}^\circ$ = ...
- 16. Cosine $0.0002746582031 \times 10^{-4}^\circ$ = ...
- 17. Cosine $1.373291016 \times 10^{-4}^\circ$ = ...
- 18. Cosine $6.866455078 \times 10^{-5}^\circ$ = ...
- 19. Cosine $3.433227539 \times 10^{-5}^\circ$ = ...
- 20. Cosine $1.71661377 \times 10^{-5}^\circ$ = ...
- 21. Cosine $8.583068848 \times 10^{-6}^\circ$ = ...
- 22. Cosine $4.291534424 \times 10^{-6}^\circ$ = ...
- 23. Cosine $2.145767212 \times 10^{-6}^\circ$ = ...
- 24. Cosine $1.072883606 \times 10^{-6}^\circ$ = ...
- 25. Cosine $5.36441803 \times 10^{-7}^\circ$ = ...
- 26. Cosine ... = ...
- 27. Cosine ... = ...

- 28. Cosine ... = ...
- 29. Cosine ... = ...
- 30. Cosine ... = ...
- 31. Cosine ... = ...
- 32. Cosine ... = ...
- 33. Cosine ... = ...
- 34. Cosine ... = ...
- 35. Cosine ... = ...
- 36. Cosine ... = ...
- 37. Cosine ... = ...
- 38. Cosine ... = ...
- 39. Cosine ... = ...
- 40. Cosine ... = ...
- = ...
- = ...
- = ...

The solution to calculate the constant (value) is through the sine compare with the solution of the triangle.

If you choose another triangle for calculation, you have to find the angle constant first.

Circumference calculation if radius is 1 and triangle angle is 30° or 60°:

Step 1: Choose angle 30°

Step 2: Sine of angle 30° multiplied by 12.

Step 3: The product divided by 2 gives 3.0

Step 4: Divide the angle 30°/ 2= 15°

Step 5: Sine of 15° multiplied 48 and the product divided by 2 gives 3.105828541.

Note:

1. The sine of the first chosen angle is multiplied 12 and the product is divided by 2.
2. The first angle is divided by 2 and the sine of the angle is multiplied by (12*2) = 24 and the product is again divided by 2, see below!

01. Sine 30°	= 0.5 * (12/2) = 3.0
02. Sine 15°	= 0.2588190451 * (24/2) = 3.105828541
03. Sine 7.5°	= 0.1305261922 * (48/2) = 3.132628613
04. Sine 3.75°	= 0.0654031292 * (96/2) = 3.139350203
05. Sine 1.875°	= 0.0327190828 * (192/2) = 3.141031951
06. Sine 0.9375°	= 0.0163617316 * (384/2) = 3.141452472
07. Sine 0.46875°	= 0.0081811396 * (768/2) = 3.141557608
08. Sine 0.234375°	= 0.004090604 * (1536/2) = 3.141583892
09. Sine 0.1171875°	= 0.0020453063 * (3072/2) = 3.141590463
10. Sine 0.05859375°	= 0.0010226537 * (6144/2) = 3.141592106
11. Sine 0.029296875°	= 0.000511326907 * (12288/2) = 3.141592517
11. Sine 0.029296875°	= 5.11326907 _E ⁻⁴ * (12288/2) = 3.141592517
12. Sine 0.0146484375°	= 0.0002556634619 * (24576/2) = 3.141592619
12. Sine 0.0146484375°	= 2.556634619 _E ⁻⁴ * (24576/2) = 3.141592619
13. Sine 0.0073242188°	= 0.000127831732 * (49152/2) = 3.141592645
13. Sine 0.0073242188°	= 1.127831732 _E ⁻⁴ * (49152/2) = 3.141592645
14. Sine 0.0036621094°	= 0.00006391586612 * (98304/2) = 3.141592651

14. Sine 0.0036621094° = $6.391586612 \cdot 10^{-5} * (98304/2) = 3.141592651$
15. Sine 0.0018310547° = $0.00003195793308 * (196608/2) = 3.141592653$
15. Sine 0.0018310547° = $3.195793308 \cdot 10^{-5} * (393216/2) = 3.1415926535...$
16. Sine 0.0009155273438° = ... * $(786432/2) = 3.14159265358...$
16. Sine $9.155273438 \cdot 10^{-4}^\circ$ = ... * $(1572864/2) = 3.141592653589...$
17. Sine $4.577636719 \cdot 10^{-4}^\circ$ = ... * $(3145728/2) = 3.1415926535897...$
18. Sine $2.288818359 \cdot 10^{-4}^\circ$ = ... * $(6291456/2) = 3.14159265358979 ...$
19. Sine $1.14440918 \cdot 10^{-4}^\circ$ = ... * $(12582912/2) = 3.141592653589793...$
20. Sine $5.722045898 \cdot 10^{-5}^\circ$ = ... * $(251652824/2) = 3.1415926535897932...$
21. Sine ... =... * ... = ...
22. Sine ... =... * ... = ...
23. Sine ... =... * ... = ...
24. Sine ... =... * ... = ...
25. Sine ... =... * ... = ...
26. Sine ... =... * ... = ...
27. Sine ... =... * ... = ...
28. Sine ... =... * ... = ...
29. Sine ... =... * ... = ...
30. Sine ... =... * ... = ...
31. Sine ... =... * ... = ...
32. Sine ... =... * ... = ...
33. Sine ... =... * ... = ...
34. Sine ... =... * ... = ...
34. Sine ... =... * ... = ...
35. Sine ... =... * ... = ...
- = ...
- = ...
- = ...

The solution to calculate the constant of height is through the cosine and not through the triangle.

The cosine always presents a percentage of the radius which also is the height at the triangle.

- 01. Cosine 30° = 0.8660254038
- 02. Cosine 15° = 0.9659258263
- 03. Cosine 7.5° = 0.9914448614
- 04. Cosine 3.75° = 0.9978589232
- 05. Cosine 1.875° = 0.9994645875
- 06. Cosine 0.9375° = 0.9998661379
- 07. Cosine 0.46875° = 0.9999665339
- 08. Cosine 0.234375° = 0.9999916334
- 09. Cosine 0.1171875° = 0.9999979084
- 10. Cosine 0.05859375° = 0.9999994771
- 11. Cosine 0.029296875° = 0.9999998693
- 12. Cosine 0.0146484375° = 0.9999999673
- 13. Cosine 0.0073242188° = 0.9999999918
- 14. Cosine 0.0036621094° = 0.999999998
- 15. Cosine 0.0018310547° = 0.9999999995
- 16. Cosine 0.0009155273438° = 0.9999999999
- 16. Cosine 9.155273438 E⁻⁴ = 0.9999999999...
- 17. Cosine 0.0004577636719° = 0.9999999999...
- 18. Cosine 2.28881836 E⁻⁴ = 0.9999999999...
- 19. Cosine 1.14440918 E⁻⁴ = 0.9999999999...
- 20. Cosine 5.722045898 E⁻⁵ = 0.9999999999...
- 21. Cosine 2.861022949 E⁻⁵ = 0.9999999999...
- 22. Cosine 1.430511475 E⁻⁵ = 0.9999999999...
- 23. Cosine 7.152557373 E⁻⁶ = 0.9999999999...
- 24. Cosine 3.576278687 E⁻⁶ = 0.9999999999...
- 25. Cosine 1.788139343 E⁻⁶ = 0.9999999999...
- 26. Cosine 8.940696716 E⁻⁷ = 0.9999999999...
- 27. Cosine 4.470348358 E⁻⁷ = 0.9999999999...

- 28. Cosine $2.235174179 \times 10^{-7}$ = 0.999999999...
- 29. Cosine $1.11758709 \times 10^{-7}$ = 0.999999999...
- 30. Cosine $5.587935448 \times 10^{-8}$ = 0.999999999...
- 31. Cosine $2.793967724 \times 10^{-8}$ = 0.999999999...
- 32. Cosine ... = ...
- 33. Cosine ... = ...
- 34. Cosine ... = ...
- 35. Cosine ... = ...
- 36. Cosine ... = ...
- 37. Cosine ... = ...
- 38. Cosine ... = ...
- 39. Cosine ... = ...
- 40. Cosine ... = ...
- = ...
- = ...
- = ...

The solution to calculate the constant (value) is through the sine compare with the solution of the triangle.

If you choose another triangle for calculation, you have to find the angle constant first.

Circumference calculation if radius is 1, 2 and $\sqrt{8}$ or and triangle angle is 45° :

Step 1: Choose angle 45°

Step 2: Sine of angle 45° multiplied by 4.

Step 3: The product gives 2.828427125

Step 4: Divide the angle $45^\circ / 2 = 22.5^\circ$

Step 5: Sine of 22.5° multiplied 8 and the product gives 3.105828541.

Note:

1. The sine of the first chosen angle is multiplied 4.
2. The first angle is divided by 2 and the sine of the angle is multiplied by $(4*2) = 8$

01. Sine 45°	= 0.7071067812 * 4 = 2.828427125
02. Sine 22.5°	= 0.3826834324 * 8 = 3.061467459
03. Sine 11.25°	= 0.195090322 * 16 = 3.121445152
04. Sine 5.625°	= 0.0980171403 * 32 = 3.136548491
05. Sine 2.8125°	= 0.0490676743 * 64 = 3.140331157
06. Sine 1.40625°	= 0.0245412285 * 128 = 3.141277251
07. Sine 0.703125°	= 0.0122715383 * 256 = 3.141513801
08. Sine 0.3515625°	= 0.0061358846 * 512 = 3.14157294
09. Sine 0.17578125°	= 0.0030679568 * 1024 = 3.141587725
10. Sine 0.087890625°	= 0.0015339802 * 2048 = 3.141591422
11. Sine 0.0439453125°	= 0.0007669903187 * 4096 = 3.141592346
12. Sine 0.0219726563°	= 0.0003834951876 * 8192 = 3.141592577
13. Sine 0.0109863281°	= 0.0001917475973 * 16384 = 3.141592653
14. Sine 0.0054931641°	= ... * 32768 = 3.1415926535...
15. Sine 0.002746582°	= ... * 65536 = 3.14159265358...
16. Sine 0.001373291°	= ... * 131072 = 3.141592653589...
17. Sine 0.0006866455078°	= ... * 262144 = 3.1415926535897...
17. Sine $6.6866455078^\circ \text{E}^{-4}$	= ... * 262144 = 3.14159265358979...

18. Sine 0.0003433227539°	= ...	* 524288 = 3.141592653589793...
18. Sine $3.433227539^\circ \text{E}^{-4}$	= ...	* 1048576 = 3.1415926535897932...
19. Sine $1.71661377^\circ \text{E}^{-4}$	= ...	* 2097152 = 3.14159265358979323...
20. Sine $8.583068848^\circ \text{E}^{-5}$	= ...	* 4194304 = 3.141592653589793238...
21. Sine $4.291534424^\circ \text{E}^{-5}$	= ...	* 8388608 = 3.1415926535897932384...
22. Sine $2.145767212^\circ \text{E}^{-5}$	= ...	* 16777216 = 3.14159265358979323846...
23. Sine $1.072883606^\circ \text{E}^{-5}$	= ...	* 33554432 = 3.141592653589793238462...
24. Sine $5.36441803^\circ \text{E}^{-6}$	= ...	* 67108864 = 3.1415926535897932384626...
25. Sine $2.682209015^\circ \text{E}^{-6}$	= ...	* 134217728 = 3.14159265358979323846264...
26. Sine ...	=...	* ... = ...
27. Sine ...	=...	* ... = ...
28. Sine ...	=...	* ... = ...
28. Sine ...	=...	* ... = ...
30. Sine ...	=...	* ... = ...
31. Sine ...	=...	* ... = ...
32. Sine ...	=...	* ... = ...
33. Sine ...	=...	* ... = ...
34. Sine ...	=...	* ... = ...
35. Sine ...	=...	* ... = ...
...	=...	* ... = ...
...	=...	* ... = ...
...	=...	* ... = ...
...	=...	* ... = ...
...	=...	* ... = ...

The solution to calculate the constant of height is through the cosine and not through the triangle.

The cosine always presents a percentage of the radius which also is the height at the triangle.

- 01. Cosine 45° = 0.7071067812
- 02. Cosine 22.5° = 0.9238795325
- 03. Cosine 11.25° = 9807852804
- 04. Cosine 5.625° = 0.9951847267
- 05. Cosine 2.8125° = 0.9987954562
- 06. Cosine 1.40625° = 0.9996988187
- 07. Cosine 0.703125° = 0.9999247018
- 08. Cosine 0.3515625° = 0.9999811753
- 09. Cosine 0.17578125° = 0.9999952938
- 10. Cosine 0.87890625° = 0.9999988235
- 11. Cosine 0.0439453125° = 0.9999997059
- 12. Cosine 0.0219726563° = 0.9999999365
- 13. Cosine 0.0109863281° = 0.9999999816
- 14. Cosine 0.0054931641° = 0.9999999954
- 15. Cosine 0.002746582° = 0.9999999989
- 16. Cosine 0.001373291° = 0.9999999997
- 17. Cosine 0.0006866455078° = 0.9999999999
- 17. Cosine $6.6866455078 \times 10^{-4}^\circ$ = 0.9999999999...
- 18. Cosine 0.0003433227539° = 0.9999999999...
- 19. Cosine $3.433227539 \times 10^{-4}^\circ$ = 0.9999999999...
- 20. Cosine $1.71661377 \times 10^{-4}^\circ$ = 0.9999999999...
- 21. Cosine $8.583068848 \times 10^{-5}^\circ$ = 0.9999999999...
- 22. Cosine $4.291534424 \times 10^{-5}^\circ$ = 0.9999999999...
- 23. Cosine $2.145767212 \times 10^{-5}^\circ$ = 0.9999999999...
- 24. Cosine $1.072883606 \times 10^{-5}^\circ$ = 0.9999999999...
- 25. Cosine $5.36441803 \times 10^{-6}^\circ$ = 0.9999999999...
- ... =...
- ... =...