

# $\text{\LaTeX}$ で作る三角関数表

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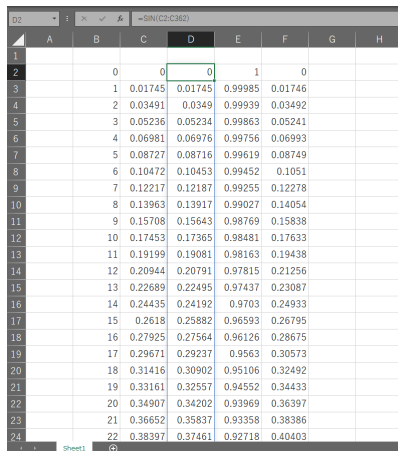
## ■ 角度

- $0^\circ \rightarrow 5^\circ$
- $25^\circ \rightarrow 30^\circ$
- $355^\circ \rightarrow 360^\circ$

に対応する  $\sin$ ,  $\cos$ ,  $\tan$  を表にまとめる.

- 度数法は必ず記し, 弧度法を使った場合は追記する.

# Excelでの手法



	A	B	C	D	E	F	G	H
1								
2			0	0	1	0		
3			1	0.01745	0.01745	0.99985	0.01746	
4			2	0.03491	0.0349	0.99939	0.03492	
5			3	0.05236	0.05234	0.99863	0.05241	
6			4	0.06981	0.06976	0.99756	0.06993	
7			5	0.08727	0.08716	0.99619	0.08749	
8			6	0.10472	0.10453	0.99452	0.1051	
9			7	0.12217	0.12187	0.99255	0.12278	
10			8	0.13963	0.13917	0.99027	0.14054	
11			9	0.15708	0.15643	0.98769	0.15838	
12			10	0.17453	0.17365	0.98481	0.17633	
13			11	0.19199	0.19081	0.98163	0.19438	
14			12	0.20944	0.20791	0.97815	0.21256	
15			13	0.22689	0.22495	0.97437	0.23087	
16			14	0.24435	0.24192	0.9703	0.24933	
17			15	0.2618	0.25882	0.96593	0.26795	
18			16	0.27925	0.27564	0.96126	0.28675	
19			17	0.29671	0.29237	0.9563	0.30573	
20			18	0.31416	0.30902	0.95106	0.32492	
21			19	0.33161	0.32557	0.94552	0.34433	
22			20	0.34907	0.34202	0.93969	0.36397	
23			21	0.36652	0.35837	0.93358	0.38386	
24			22	0.38397	0.37461	0.92718	0.40403	

angle[°]	angle[rad]	sin	cos	tan
0	0	0	1	0
1	0.017453293	0.017452406	0.999847695	0.017455065
2	0.034906585	0.034899497	0.999390827	0.034920769
3	0.052359878	0.052335956	0.998629535	0.052407779
4	0.06981317	0.069756474	0.99756405	0.069926812
5	0.087266463	0.087155743	0.996194698	0.087488664
⋮	⋮	⋮	⋮	⋮
25	0.436332313	0.422618262	0.906307787	0.466307658
26	0.453785606	0.438371147	0.898794046	0.487732589
27	0.471238898	0.4539905	0.891006524	0.509525449
28	0.488692191	0.469471563	0.882947593	0.531709432
29	0.506145483	0.48480962	0.874619707	0.554309051
30	0.523598776	0.5	0.866025404	0.577350269
⋮	⋮	⋮	⋮	⋮
355	6.195918845	-0.087155743	0.996194698	-0.087488664
356	6.213372137	-0.069756474	0.99756405	-0.069926812
357	6.23082543	-0.052335956	0.998629535	-0.052407779
358	6.248278722	-0.034899497	0.999390827	-0.034920769
359	6.265732015	-0.017452406	0.999847695	-0.017455065
360	6.283185307	-2.4503E-16	1	-2.4503E-16

- Excelで計算して csv2tabular とかで変換するだけ。

# trig の手法

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```
\usepackage{trig}
\newcommand\DegSin[1]{\CalculateSin{#1}\UseSin{#1}}
\newcommand\DegCos[1]{\CalculateCos{#1}\UseCos{#1}}
\newcommand\DegTan[1]{\CalculateTan{#1}\UseTan{#1}}
\begin{document}
\begin{table}[H]
\centering
\begin{tabular}{c|ccc}
angle[ $^{\circ}$ ] & sin & cos & tan \\
\hline
0 & 0 & 1 & 0.0 \\
1 & 0.01743 & 0.99985 & 0.01743 \\
2 & 0.03488 & 0.99939 & 0.0349 \\
3 & 0.05232 & 0.99863 & 0.05238 \\
4 & 0.06975 & 0.99756 & 0.06992 \\
5 & 0.08714 & 0.99619 & 0.08748 \\
\vdots & \vdots & \vdots & \vdots \\
25 & 0.4226 & 0.9063 & 0.46632 \\
26 & 0.43835 & 0.89879 & 0.48773 \\
27 & 0.45398 & 0.89099 & 0.50952 \\
28 & 0.46945 & 0.88293 & 0.5317 \\
29 & 0.48479 & 0.8746 & 0.5543 \\
30 & 0.49998 & 0.86601 & 0.57736 \\
\vdots & \vdots & \vdots & \vdots \\
355 & -0.08714 & 0.99619 & -0.08748 \\
356 & -0.06975 & 0.99756 & -0.06992 \\
357 & -0.05232 & 0.99863 & -0.05238 \\
358 & -0.03488 & 0.99939 & -0.0349 \\
359 & -0.01743 & 0.99985 & -0.01743 \\
360 & 0 & 1 & 0.0
\end{tabular}
\end{table}
\end{document}
```

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angle[ $^{\circ}$ ]	sin	cos	tan
0	0	1	0.0
1	0.01743	0.99985	0.01743
2	0.03488	0.99939	0.0349
3	0.05232	0.99863	0.05238
4	0.06975	0.99756	0.06992
5	0.08714	0.99619	0.08748
$\vdots$	$\vdots$	$\vdots$	$\vdots$
25	0.4226	0.9063	0.46632
26	0.43835	0.89879	0.48773
27	0.45398	0.89099	0.50952
28	0.46945	0.88293	0.5317
29	0.48479	0.8746	0.5543
30	0.49998	0.86601	0.57736
$\vdots$	$\vdots$	$\vdots$	$\vdots$
355	-0.08714	0.99619	-0.08748
356	-0.06975	0.99756	-0.06992
357	-0.05232	0.99863	-0.05238
358	-0.03488	0.99939	-0.0349
359	-0.01743	0.99985	-0.01743
360	0	1	0.0

- trig によって  $\text{\LaTeX}$  上で計算が出来る.

# Lua での手法

```
\usepackage{luacode}
\begin{luacode*}
function to(i)
  j=i*math.pi/180
  return tostring(i).." & "..tostring(j).." & "..tostring(
    math.sin(j)).." & "..tostring(math.cos(j)).."
    & "..tostring(math.tan(j)).."\\\\"
end
function fg()
  v=""
  m="$\\vdots $ & $\\vdots $ & $\\vdots $ & $\\vdots $ & $\\vdots $ & $\\vdots $ & $\\vdots $ & $\\vdots $"
  for i=0,5,1 do
    v = v..to(i)
  end
  v=v..m
  for i=25,30,1 do
    v = v..to(i)
  end
  v=v..m
  for i=355,360,1 do
    v = v..to(i)
  end
  tex.sprint("\\newcommand{\\sd}{\"..v..\"}")
end
\end{luacode*}
\directlua{ fg() }
\begin{document}
\begin{table}[H]
\centering
\caption{Lua言語を用いた三角関数表}
\begin{tabular}{ccccc}
angle[$^\circ$]&angle[rad]&sin&cos&tan\\
\sd
\end{tabular}
\end{table}
\end{document}
```

angle[°]	angle[rad]	sin	cos	tan
0	0.0	0.0	1.0	0.0
1	0.017453292519943	0.017452406437284	0.99984769515639	0.017455064928218
2	0.034906585039887	0.034899496702501	0.9993908270191	0.034920769491748
3	0.05235987755983	0.052335956242944	0.99862953475457	0.052407779283041
4	0.069813170079773	0.069756473744125	0.99756405025982	0.06992681194351
5	0.087266462599716	0.087155742747658	0.99619469809175	0.087488663525924
:	:	:	:	:
25	0.43633231299858	0.4226182617407	0.90630778703665	0.466307658155
26	0.45378560551853	0.43837114678908	0.89879404629917	0.48773258856586
27	0.47123889803847	0.45399049973955	0.89100652418837	0.50952544949443
28	0.48869219055841	0.46947156278589	0.88294759285893	0.53170943166148
29	0.50614548307836	0.48480962024634	0.8746197071394	0.55430905145277
30	0.5235987755983	0.5	0.86602540378444	0.57735026918963
:	:	:	:	:
355	6.1959188445799	-0.087155742747658	0.99619469809175	-0.087488663525924
356	6.2133721370998	-0.069756473744125	0.99756405025982	-0.06992681194351
357	6.2308254296198	-0.052335956242944	0.99862953475457	-0.052407779283042
358	6.2482787221397	-0.034899496702501	0.9993908270191	-0.034920769491748
359	6.2657320146596	-0.017452406437284	0.99984769515639	-0.017455064928219
360	6.2831853071796	-2.4492935982947e-16	1.0	-2.4492935982947e-16

■ Lua によって Lua $\text{\LaTeX}$  上で繰り返し計算及び表示が出来る。

# 各手法の評価

手法	長所	短所
2.1 Excel	簡単	$\text{\LaTeX}$ で完結しない Excel に詳しい必要がある
2.2 trig	$\text{\LaTeX}$ で完結する	文量が多い 精度が良くない
2.3 Lua	$\text{Lua}\text{\LaTeX}$ で完結する きれいに書ける	難しい

Excelで良いと思います