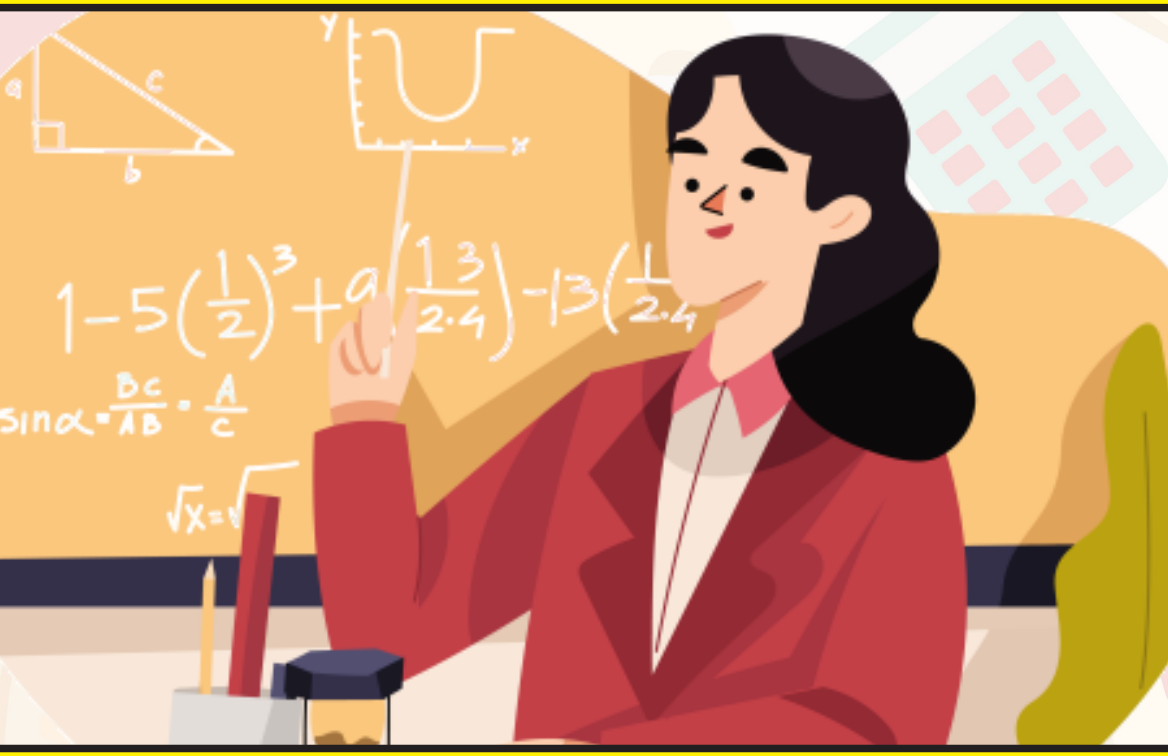
BeeSmart

มัธยมศึกษาปีที่3



อัตราส่วนตรีโกณมิติ

แบบฝึกหัด

Calculate the value

[#1] cos(270°) =
[#2] sin(180°) =
[#3] cos(180°) =
[#4] tan(60°) =
[#5] sin(90°) =
[#6] cos(60°) =
[#7] sin(30°) =
[#8] tan(90°) =
[#9] sin(270°) =
[#10] tan(0°) =
[#11] tan(270°) =
[#12] sin(0°) =
[#13] tan(45°) =
[#14] sin(45°) =
[#15] cos(45°) =
[#16] cos(0°) =




เฉลยแบบฝึกหัด Calculate the value

[#1] $\cos(270^\circ) = 0$

[#2] $\sin(180^\circ) = 0$

[#3] $\cos(180^\circ) = -1$

[#4] $\tan(60^\circ) = \sqrt{3}$

[#5] $\sin(90^\circ) = 1$

[#6]

$$\cos(60^\circ) = \frac{1}{2}$$

[#7]

$$\sin(30^\circ) = \frac{1}{2}$$

[#8] $\tan(90^\circ) =$ เป็นไปไม่ได้

[#9] $\sin(270^\circ) = -1$

[#10] $\tan(0^\circ) = 0$

[#11] $\tan(270^\circ) =$ เป็นไปไม่ได้

[#12] $\sin(0^\circ) = 0$

[#13] $\tan(45^\circ) = 1$

[#14]

$$\sin(45^\circ) = \frac{\sqrt{2}}{2}$$

[#15]

$$\cos(45^\circ) = \frac{\sqrt{2}}{2}$$

[#16] $\cos(0^\circ) = 1$

Calculate the value

[#1] tan(30°) =
[#2] cos(90°) =
[#3] sin(60°) =
[#4] cos(30°) =
[#5] tan(180°) =
[#6] tan(180°) =
[#7] cos(90°) =
[#8] tan(60°) =
[#9] cos(60°) =
[#10] sin(270°) =
[#11] tan(45°) =
[#12] sin(45°) =
[#13] tan(180°) =
[#14] tan(90°) =
[#15] cos(180°) =
[#16] tan(45°) =




เฉลยแบบฝึกหัด Calculate the value

[#1] $\tan(30^\circ) = \frac{1}{\sqrt{3}}$

[#2] $\cos(90^\circ) = 0$

[#3] $\sin(60^\circ) = \frac{\sqrt{3}}{2}$

[#4] $\cos(30^\circ) = \frac{\sqrt{3}}{2}$

[#5] $\tan(180^\circ) = 0$

[#6] $\tan(180^\circ) = 0$

[#7] $\cos(90^\circ) = 0$

[#8] $\tan(60^\circ) = \sqrt{3}$

[#9] $\cos(60^\circ) = \frac{1}{2}$

[#10] $\sin(270^\circ) = -1$

[#11] $\tan(45^\circ) = 1$

[#12] $\sin(45^\circ) = \frac{\sqrt{2}}{2}$

[#13] $\tan(180^\circ) = 0$

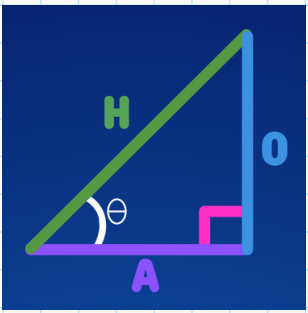
[#14] $\tan(90^\circ) =$ เป็นไปไม่ได้

[#15] $\cos(180^\circ) = -1$

[#16] $\tan(45^\circ) = 1$

SOH CAH TOA

[#1]	Θ = 30°	H = 8	O = ?
[#2]	Θ = 60°	O = 18	A = ?
[#3]	Θ = 30°	O = 8	H = ?
[#4]	Θ = 60°	A = 7	H = ?
[#5]	Θ = 60°	H = 10	A = ?
[#6]	Θ = 60°	A = 6	H = ?
[#7]	Θ = 60°	A = 6	O = ?
[#8]	Θ = 60°	O = 6	A = ?
[#9]	Θ = 60°	A = 2	H = ?
[#10]	Θ = 60°	A = 8	H = ?
[#11]	Θ = 60°	O = 20	A = ?
[#12]	Θ = 60°	A = 9	H = ?
[#13]	Θ = 60°	H = 20	A = ?
[#14]	Θ = 60°	A = 9	O = ?
[#15]	Θ = 30°	H = 20	O = ?
[#16]	Θ = 60°	H = 8	A = ?



เฉลยแบบฝึกหัด SOH CAH TOA

[#1] O = 4

[#2] A = $18 / \sqrt{3}$

[#3] H = 16

[#4] A = 14

[#5] A = 5

[#6] A = 12

[#7] O = $6\sqrt{3}$

[#8] A = $6 / \sqrt{3}$

[#9] A = 4

[#10] A = 16

[#11] A = $20 / \sqrt{3}$

[#12] A = 18

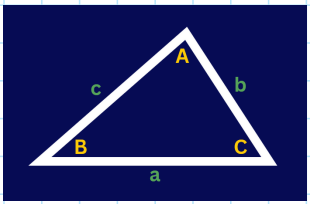
[#13] A = 10

[#14] O = $9\sqrt{3}$

[#15] O = 10

[#16] A = 4

Use the sine rule



[#1] a = 40 A = 90° b = 20 B = ?
[#2] c = 18 C = 30° B = 60° b = ?
[#3] a = 22 A = 90° b = 11 B = ?
[#4] a = 10 A = 90° b = 5 B = ?
[#5] c = 36 C = 90° b = 18 B = ?
[#6] a = 12 A = 90° b = 6 B = ?
[#7] c = 8 C = 30° B = 60° b = ?
[#8] c = 30 C = 90° b = 15 B = ?
[#9] a = 28 A = 90° b = 14 B = ?
[#10] a = 7 A = 30° B = 60° b = ?
[#11] a = 20 A = 90° b = 10 B = ?
[#12] c = 18 C = 90° b = 9 B = ?
[#13] c = 32 C = 90° b = 16 B = ?
[#14] c = 10 C = 30° B = 60° b = ?
[#15] a = 34 A = 90° b = 17 B = ?
[#16] a = 8 A = 30° B = 60° b = ?

เฉลยแบบฝึกหัด Use the sine rule

[#1] $\sin(B) = 20\,\frac{1}{40} \quad \sin(B) = 0.5 \quad B = 30^\circ$

[#2] $b = \frac{18}{\sin(30^\circ)} \times \sin(60^\circ) = 36 \times \frac{\sqrt{3}}{2} = 18\sqrt{3}$

[#3] $\sin(B) = 11\,\frac{1}{22} \quad \sin(B) = 0.5 \quad B = 30^\circ$

[#4] $\sin(B) = 5\,\frac{1}{10} \quad \sin(B) = 0.5 \quad B = 30^\circ$

[#5] $\sin(B) = 18\,\frac{1}{36} \quad \sin(B) = 0.5 \quad B = 30^\circ$

[#6] $\sin(B) = 6\,\frac{1}{12} \quad \sin(B) = 0.5 \quad B = 30^\circ$

[#7] $b = \frac{8}{\sin(30^\circ)} \times \sin(60^\circ) = 16 \times \frac{\sqrt{3}}{2} = 8\sqrt{3}$

[#8] $\sin(B) = 15\,\frac{1}{30} \quad \sin(B) = 0.5 \quad B = 30^\circ$

[#9] $\sin(B) = 14\,\frac{1}{28} \quad \sin(B) = 0.5 \quad B = 30^\circ$

[#10] $b = \frac{7}{\sin(30^\circ)} \times \sin(60^\circ) = 14 \times \frac{\sqrt{3}}{2} = 7\sqrt{3}$

[#11] $\sin(B) = 10\,\frac{1}{20} \quad \sin(B) = 0.5 \quad B = 30^\circ$

[#12] $\sin(B) = 9\,\frac{1}{18} \quad \sin(B) = 0.5 \quad B = 30^\circ$

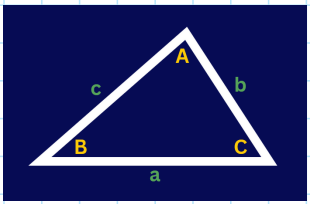
[#13] $\sin(B) = 16\,\frac{1}{32} \quad \sin(B) = 0.5 \quad B = 30^\circ$

[#14] $b = \frac{10}{\sin(30^\circ)} \times \sin(60^\circ) = 20 \times \frac{\sqrt{3}}{2} = 10\sqrt{3}$

[#15] $\sin(B) = 17\,\frac{1}{34} \quad \sin(B) = 0.5 \quad B = 30^\circ$

[#16] $b = \frac{8}{\sin(30^\circ)} \times \sin(60^\circ) = 16 \times \frac{\sqrt{3}}{2} = 8\sqrt{3}$

Use the cosine rule



[#1] a = 4 b = 4 C = 60° c = ?
[#2] b = 16 c = 9 A = 60° a = ?
[#3] a = 8 b = 16 C = 60° c = ?
[#4] b = 12 c = 19 A = 60° a = ?
[#5] a = 14 b = 18 C = 60° c = ?
[#6] b = 17 c = 17 A = 60° a = ?
[#7] b = 6 c = 8 A = 60° a = ?
[#8] b = 10 c = 15 A = 60° a = ?
[#9] b = 5 c = 5 A = 60° a = ?
[#10] a = 7 b = 6 C = 60° c = ?
[#11] b = 19 c = 11 A = 60° a = ?
[#12] a = 13 b = 3 C = 60° c = ?
[#13] b = 11 c = 7 A = 60° a = ?
[#14] a = 15 b = 14 C = 60° c = ?
[#15] b = 9 c = 20 A = 60° a = ?
[#16] a = 2 b = 12 C = 60° c = ?

เฉลยแบบฝึกหัด Use the cosine rule

[#1] $c^2 = 4^2 + 4^2 - 2 \cdot 4 \cdot 4 \cdot \cos(60^\circ) = 16 + 16 - 32 \cdot 0.5 = 16$
$c = \sqrt{16} = 4$

[#2] $a^2 = 16^2 + 9^2 - 2 \cdot 16 \cdot 9 \cdot \cos(60^\circ) = 256 + 81 - 288 \cdot 0.5 = 193$
$a = \sqrt{193} = 13.9$

[#3] $c^2 = 8^2 + 16^2 - 2 \cdot 8 \cdot 16 \cdot \cos(60^\circ) = 64 + 256 - 256 \cdot 0.5 = 192$
$c = \sqrt{192} = 13.9$

[#4] $a^2 = 12^2 + 19^2 - 2 \cdot 12 \cdot 19 \cdot \cos(60^\circ) = 144 + 361 - 456 \cdot 0.5 = 277$
$a = \sqrt{277} = 16.6$

[#5] $c^2 = 14^2 + 18^2 - 2 \cdot 14 \cdot 18 \cdot \cos(60^\circ) = 196 + 324 - 504 \cdot 0.5 = 268$
$c = \sqrt{268} = 16.4$

[#6] $a^2 = 17^2 + 17^2 - 2 \cdot 17 \cdot 17 \cdot \cos(60^\circ) = 289 + 289 - 578 \cdot 0.5 = 289$
$a = \sqrt{289} = 17$

[#7] $a^2 = 6^2 + 8^2 - 2 \cdot 6 \cdot 8 \cdot \cos(60^\circ) = 36 + 64 - 96 \cdot 0.5 = 52$
$a = \sqrt{52} = 7.2$

[#8] $a^2 = 10^2 + 15^2 - 2 \cdot 10 \cdot 15 \cdot \cos(60^\circ) = 100 + 225 - 300 \cdot 0.5 = 175$
$a = \sqrt{175} = 13.2$

[#9] $a^2 = 5^2 + 5^2 - 2 \cdot 5 \cdot 5 \cdot \cos(60^\circ) = 25 + 25 - 50 \cdot 0.5 = 25$
$a = \sqrt{25} = 5$

[#10] $c^2 = 7^2 + 6^2 - 2 \cdot 7 \cdot 6 \cdot \cos(60^\circ) = 49 + 36 - 84 \cdot 0.5 = 43$
$c = \sqrt{43} = 6.6$

[#11] $a^2 = 19^2 + 11^2 - 2 \cdot 19 \cdot 11 \cdot \cos(60^\circ) = 361 + 121 - 418 \cdot 0.5 = 273$
$a = \sqrt{273} = 16.5$

[#12] $c^2 = 13^2 + 3^2 - 2 \cdot 13 \cdot 3 \cdot \cos(60^\circ) = 169 + 9 - 78 \cdot 0.5 = 139$
$c = \sqrt{139} = 11.8$

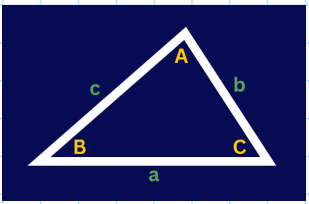
[#13] $a^2 = 11^2 + 7^2 - 2 \cdot 11 \cdot 7 \cdot \cos(60^\circ) = 121 + 49 - 154 \cdot 0.5 = 93$
$a = \sqrt{93} = 9.6$

[#14] $c^2 = 15^2 + 14^2 - 2 \cdot 15 \cdot 14 \cdot \cos(60^\circ) = 225 + 196 - 420 \cdot 0.5 = 211$
$c = \sqrt{211} = 14.5$

[#15] $a^2 = 9^2 + 20^2 - 2 \cdot 9 \cdot 20 \cdot \cos(60^\circ) = 81 + 400 - 360 \cdot 0.5 = 301$
$a = \sqrt{301} = 17.3$

[#16] $c^2 = 2^2 + 12^2 - 2 \cdot 2 \cdot 12 \cdot \cos(60^\circ) = 4 + 144 - 48 \cdot 0.5 = 124$
$c = \sqrt{124} = 11.1$

Find the area of the triangle



[#1] b = 10 c = 6 A = 30° AREA = ?
[#2] a = 5 b = 20 C = 30° AREA = ?
[#3] a = 14 b = 4 C = 30° AREA = ?
[#4] a = 8 b = 6 C = 45° AREA = ?
[#5] a = 4 b = 9 C = 30° AREA = ?
[#6] a = 13 b = 10 C = 30° AREA = ?
[#7] b = 6 c = 10 A = 30° AREA = ?
[#8] a = 7 c = 3 B = 60° AREA = ?
[#9] a = 2 c = 19 B = 60° AREA = ?
[#10] b = 5 c = 2 A = 30° AREA = ?
[#11] b = 12 c = 15 A = 30° AREA = ?
[#12] b = 20 c = 17 A = 30° AREA = ?

เฉลยแบบฝึกหัด Find the area of the triangle

[#1] AREA = $\frac{1}{2}$ bc sin(A) = 0.5 · 10 · 6 · sin(30°) = 15

[#2] AREA = $\frac{1}{2}$ ab sin(C) = 0.5 · 5 · 20 · sin(30°) = 25

[#3] AREA = $\frac{1}{2}$ ab sin(C) = 0.5 · 14 · 4 · sin(30°) = 14

[#4] AREA = $\frac{1}{2}$ ab sin(C) = 0.5 · 8 · 6 · sin(45°) = 17

[#5] AREA = $\frac{1}{2}$ ab sin(C) = 0.5 · 4 · 9 · sin(30°) = 9

[#6] AREA = $\frac{1}{2}$ ab sin(C) = 0.5 · 13 · 10 · sin(30°) = 32.5

[#7] AREA = $\frac{1}{2}$ bc sin(A) = 0.5 · 6 · 10 · sin(30°) = 15

[#8] AREA = $\frac{1}{2}$ ac sin(B) = 0.5 · 7 · 3 · sin(60°) = 9.1

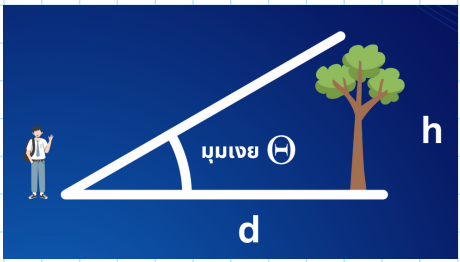
[#9] AREA = $\frac{1}{2}$ ac sin(B) = 0.5 · 2 · 19 · sin(60°) = 16.5

[#10] AREA = $\frac{1}{2}$ bc sin(A) = 0.5 · 5 · 2 · sin(30°) = 2.5

[#11] AREA = $\frac{1}{2}$ bc sin(A) = 0.5 · 12 · 15 · sin(30°) = 45

[#12] AREA = $\frac{1}{2}$ bc sin(A) = 0.5 · 20 · 17 · sin(30°) = 85

Find the height of the tree



[#1] h = 6 Θ = 45 d = ?
[#2] d = 15 Θ = 60 h = ?
[#3] d = 9 Θ = 45 h = ?
[#4] d = 12 Θ = 60 h = ?
[#5] h = 21 Θ = 45 d = ?
[#6] d = 36 Θ = 60 h = ?
[#7] d = 18 Θ = 45 h = ?
[#8] d = 48 Θ = 45 h = ?
[#9] d = 18 Θ = 60 h = ?
[#10] d = 21 Θ = 60 h = ?
[#11] h = 51 Θ = 45 d = ?
[#12] d = 54 Θ = 30 h = ?
[#13] d = 33 Θ = 60 h = ?
[#14] d = 15 Θ = 45 h = ?
[#15] d = 30 Θ = 60 h = ?
[#16] d = 57 Θ = 30 h = ?

เฉลยแบบฝึกหัด Find the height of the tree

[#1] $d = \frac{h}{\tan(\Theta)} = \frac{6}{\tan(45)} = \frac{6}{1} = 6$

[#2] $h = d \cdot \tan(\Theta) = 15 \cdot \tan(60) = 15 \cdot \sqrt{3}$

[#3] $h = d \cdot \tan(\Theta) = 9 \cdot \tan(45) = 9 \cdot 1 = 9$

[#4] $h = d \cdot \tan(\Theta) = 12 \cdot \tan(60) = 12 \cdot \sqrt{3}$

[#5] $d = \frac{h}{\tan(\Theta)} = \frac{21}{\tan(45)} = \frac{21}{1} = 21$

[#6] $h = d \cdot \tan(\Theta) = 36 \cdot \tan(60) = 36 \cdot \sqrt{3}$

[#7] $h = d \cdot \tan(\Theta) = 18 \cdot \tan(45) = 18 \cdot 1 = 18$

[#8] $h = d \cdot \tan(\Theta) = 48 \cdot \tan(45) = 48 \cdot 1 = 48$

[#9] $h = d \cdot \tan(\Theta) = 18 \cdot \tan(60) = 18 \cdot \sqrt{3}$

[#10] $h = d \cdot \tan(\Theta) = 21 \cdot \tan(60) = 21 \cdot \sqrt{3}$

[#11] $d = \frac{h}{\tan(\Theta)} = \frac{51}{\tan(45)} = \frac{51}{1} = 51$

[#12] $h = d \cdot \tan(\Theta) = 54 \cdot \tan(30) = 54 \cdot \frac{\sqrt{3}}{3} = 18\sqrt{3}$

[#13] $h = d \cdot \tan(\Theta) = 33 \cdot \tan(60) = 33 \cdot \sqrt{3}$

[#14] $h = d \cdot \tan(\Theta) = 15 \cdot \tan(45) = 15 \cdot 1 = 15$

[#15] $h = d \cdot \tan(\Theta) = 30 \cdot \tan(60) = 30 \cdot \sqrt{3}$

[#16] $h = d \cdot \tan(\Theta) = 57 \cdot \tan(30) = 57 \cdot \frac{\sqrt{3}}{3} = 19\sqrt{3}$

Calculate the value without using a calculator

[#1] sin (75) =
[#2] cos (105) =
[#3] cos (75) =
[#4] sin (15) =
[#5] cos (15) =
[#6] sin (105) =

เฉลยแบบฝึกหัด Calculate the value without using a calculator

[#1] $\sin(75) = \sin(45+30) = \sin(45)\cos(30) + \sin(30)\cos(45)$

$$\frac{\sqrt{2}}{2}\frac{\sqrt{3}}{2} + \frac{1}{2}\frac{\sqrt{2}}{2} = \frac{(\sqrt{6}+\sqrt{2})}{4}$$

[#2] $\cos(105) = \cos(60+45) = \cos(60)\cos(45) - \sin(60)\sin(45)$

$$\frac{1}{2}\frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{2}\frac{\sqrt{2}}{2} = \frac{(\sqrt{2}-\sqrt{6})}{4}$$

[#3] $\cos(75) = \cos(45+30) = \cos(45)\cos(30) - \sin(45)\sin(30)$

$$\frac{\sqrt{2}}{2}\frac{\sqrt{3}}{2} - \frac{\sqrt{2}}{2}\frac{1}{2} = \frac{(\sqrt{6}+\sqrt{2})}{4}$$

[#4] $\sin(15) = \sin(60-45) = \sin(60)\cos(45) - \sin(45)\cos(60)$

$$\frac{\sqrt{3}}{2}\frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2}\frac{1}{2} = \frac{(\sqrt{6}-\sqrt{2})}{4}$$

[#5] $\cos(15) = \cos(60-45) = \cos(60)\cos(45) + \sin(60)\sin(45)$

$$\frac{\sqrt{3}}{2}\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}\frac{1}{2} = \frac{(\sqrt{6}+\sqrt{2})}{4}$$

[#6] $\sin(105) = \sin(60+45) = \sin(60)\cos(45) + \sin(45)\cos(60)$

$$\frac{\sqrt{3}}{2}\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}\frac{1}{2} = \frac{(\sqrt{6}+\sqrt{2})}{4}$$

Calculate the value without using a calculator

[#1] sin (90) + sin (0) =
[#2] sin (90) + sin (0) =
[#3] sin (90) + sin (0) =
[#4] sin (90) + sin (0) =
[#5] sin (90) + sin (0) =
[#6] sin (90) + sin (0) =

เฉลยแบบฝึกหัด Calculate the value without using a calculator

[#1] $2\sin(45)\cos(45) = \frac{2 \cdot \sqrt{2}}{2\sqrt{2}} = \frac{2 \cdot 2}{4} = 1$

[#2] $2\sin(45)\cos(45) = \frac{2 \cdot \sqrt{2}}{2\sqrt{2}} = \frac{2 \cdot 2}{4} = 1$

[#3] $2\sin(45)\cos(45) = \frac{2 \cdot \sqrt{2}}{2\sqrt{2}} = \frac{2 \cdot 2}{4} = 1$

[#4] $2\sin(45)\cos(45) = \frac{2 \cdot \sqrt{2}}{2\sqrt{2}} = \frac{2 \cdot 2}{4} = 1$

[#5] $2\sin(45)\cos(45) = \frac{2 \cdot \sqrt{2}}{2\sqrt{2}} = \frac{2 \cdot 2}{4} = 1$

[#6] $2\sin(45)\cos(45) = \frac{2 \cdot \sqrt{2}}{2\sqrt{2}} = \frac{2 \cdot 2}{4} = 1$

Calculate the value

[#1] cos(270°) =
[#2] sin(180°) =
[#3] cos(90°) =
[#4] tan(30°) =
[#5] tan(180°) =
[#6] sin(60°) =
[#7] tan(45°) =
[#8] sin(0°) =
[#9] tan(90°) =
[#10] sin(30°) =
[#11] sin(270°) =
[#12] cos(45°) =
[#13] sin(45°) =
[#14] cos(180°) =
[#15] sin(90°) =
[#16] tan(60°) =

เฉลยแบบฝึกหัด Calculate the value

[#1] $\cos(270^\circ) = 0$

[#2] $\sin(180^\circ) = 0$

[#3] $\cos(90^\circ) = 0$

[#4] $\tan(30^\circ) = \frac{1}{\sqrt{3}}$

[#5] $\tan(180^\circ) = 0$

[#6] $\sin(60^\circ) = \frac{\sqrt{3}}{2}$

[#7] $\tan(45^\circ) = 1$

[#8] $\sin(0^\circ) = 0$

[#9] $\tan(90^\circ) =$ เป็นไปไม่ได้

[#10] $\sin(30^\circ) = \frac{1}{2}$

[#11] $\sin(270^\circ) = -1$

[#12] $\cos(45^\circ) = \frac{\sqrt{2}}{2}$

[#13] $\sin(45^\circ) = \frac{\sqrt{2}}{2}$

[#14] $\cos(180^\circ) = -1$

[#15] $\sin(90^\circ) = 1$

[#16] $\tan(60^\circ) = \sqrt{3}$

Calculate the value

[#1] tan(0°) =
[#2] cos(30°) =
[#3] cos(0°) =
[#4] cos(60°) =
[#5] tan(270°) =
[#6] tan(45°) =
[#7] cos(180°) =
[#8] tan(90°) =
[#9] cos(90°) =
[#10] sin(90°) =
[#11] cos(90°) =
[#12] tan(60°) =
[#13] cos(0°) =
[#14] tan(180°) =
[#15] sin(270°) =
[#16] cos(45°) =

เฉลยแบบฝึกหัด Calculate the value

[#1] $\tan(0^\circ) = 0$

[#2] $\cos(30^\circ) = \frac{\sqrt{3}}{2}$

[#3] $\cos(0^\circ) = 1$

[#4] $\cos(60^\circ) = \frac{1}{2}$

[#5] $\tan(270^\circ) =$ เป็นไปไม่ได้

[#6] $\tan(45^\circ) = 1$

[#7] $\cos(180^\circ) = -1$

[#8] $\tan(90^\circ) =$ เป็นไปไม่ได้

[#9] $\cos(90^\circ) = 0$

[#10] $\sin(90^\circ) = 1$

[#11] $\cos(90^\circ) = 0$

[#12] $\tan(60^\circ) = \sqrt{3}$

[#13] $\cos(0^\circ) = 1$

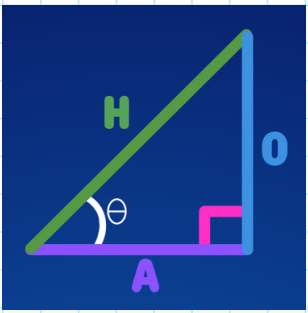
[#14] $\tan(180^\circ) = 0$

[#15] $\sin(270^\circ) = -1$

[#16] $\cos(45^\circ) = \frac{\sqrt{2}}{2}$

SOH CAH TOA

[#1]	Θ = 30°	H = 6	O = ?
[#2]	Θ = 30°	O = 3	H = ?
[#3]	Θ = 60°	O = 14	A = ?
[#4]	Θ = 60°	H = 20	A = ?
[#5]	Θ = 60°	H = 10	A = ?
[#6]	Θ = 30°	O = 8	H = ?
[#7]	Θ = 60°	A = 10	O = ?
[#8]	Θ = 60°	A = 6	O = ?
[#9]	Θ = 60°	H = 14	A = ?
[#10]	Θ = 60°	H = 4	A = ?
[#11]	Θ = 60°	O = 6	A = ?
[#12]	Θ = 60°	A = 3	O = ?
[#13]	Θ = 30°	O = 6	H = ?
[#14]	Θ = 60°	A = 4	O = ?
[#15]	Θ = 30°	O = 4	H = ?
[#16]	Θ = 60°	A = 10	H = ?



เฉลยแบบฝึกหัด SOH CAH TOA

[#1] O = 3

[#2] H = 6

[#3] A = $14 / \sqrt{3}$

[#4] A = 10

[#5] A = 5

[#6] H = 16

[#7] O = $10\sqrt{3}$

[#8] O = $6\sqrt{3}$

[#9] A = 7

[#10] A = 2

[#11] A = $6 / \sqrt{3}$

[#12] O = $3\sqrt{3}$

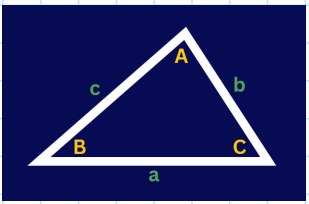
[#13] H = 12

[#14] O = $4\sqrt{3}$

[#15] H = 8

[#16] A = 20

Use the sine rule



[#1] a = 7 A = 30° B = 60° b = ?
[#2] a = 36 A = 90° b = 18 B = ?
[#3] a = 16 A = 30° B = 60° b = ?
[#4] c = 30 C = 90° b = 15 B = ?
[#5] c = 22 C = 90° b = 11 B = ?
[#6] c = 20 C = 30° B = 60° b = ?
[#7] a = 6 A = 90° b = 3 B = ?
[#8] a = 3 A = 30° B = 60° b = ?
[#9] c = 8 C = 90° b = 4 B = ?
[#10] a = 14 A = 30° B = 60° b = ?
[#11] c = 16 C = 30° B = 60° b = ?
[#12] c = 36 C = 90° b = 18 B = ?
[#13] a = 40 A = 90° b = 20 B = ?
[#14] a = 17 A = 30° B = 60° b = ?
[#15] c = 14 C = 90° b = 7 B = ?
[#16] c = 10 C = 90° b = 5 B = ?

เฉลยแบบฝึกหัด Use the sine rule

[#1] $b = \frac{7}{\sin(30^\circ)} \times \sin(60^\circ) = 14 \times \frac{\sqrt{3}}{2} = 7\sqrt{3}$

[#2] $\sin(B) = 18\ \frac{1}{36}$ $\sin(B) = 0.5$ $B = 30^\circ$

[#3] $b = \frac{16}{\sin(30^\circ)} \times \sin(60^\circ) = 32 \times \frac{\sqrt{3}}{2} = 16\sqrt{3}$

[#4] $\sin(B) = 15\ \frac{1}{30}$ $\sin(B) = 0.5$ $B = 30^\circ$

[#5] $\sin(B) = 11\ \frac{1}{22}$ $\sin(B) = 0.5$ $B = 30^\circ$

[#6] $b = \frac{20}{\sin(30^\circ)} \times \sin(60^\circ) = 40 \times \frac{\sqrt{3}}{2} = 20\sqrt{3}$

[#7] $\sin(B) = 3\ \frac{1}{6}$ $\sin(B) = 0.5$ $B = 30^\circ$

[#8] $b = \frac{3}{\sin(30^\circ)} \times \sin(60^\circ) = 6 \times \frac{\sqrt{3}}{2} = 3\sqrt{3}$

[#9] $\sin(B) = 4\ \frac{1}{8}$ $\sin(B) = 0.5$ $B = 30^\circ$

[#10] $b = \frac{14}{\sin(30^\circ)} \times \sin(60^\circ) = 28 \times \frac{\sqrt{3}}{2} = 14\sqrt{3}$

[#11] $b = \frac{16}{\sin(30^\circ)} \times \sin(60^\circ) = 32 \times \frac{\sqrt{3}}{2} = 16\sqrt{3}$

[#12] $\sin(B) = 18\ \frac{1}{36}$ $\sin(B) = 0.5$ $B = 30^\circ$

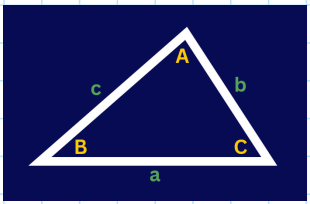
[#13] $\sin(B) = 20\ \frac{1}{40}$ $\sin(B) = 0.5$ $B = 30^\circ$

[#14] $b = \frac{17}{\sin(30^\circ)} \times \sin(60^\circ) = 34 \times \frac{\sqrt{3}}{2} = 17\sqrt{3}$

[#15] $\sin(B) = 7\ \frac{1}{14}$ $\sin(B) = 0.5$ $B = 30^\circ$

[#16] $\sin(B) = 5\ \frac{1}{10}$ $\sin(B) = 0.5$ $B = 30^\circ$

Use the cosine rule



[#1] a = 12 b = 12 C = 60° c = ?
[#2] a = 9 b = 5 C = 60° c = ?
[#3] a = 14 b = 2 C = 60° c = ?
[#4] a = 19 b = 13 C = 60° c = ?
[#5] a = 18 b = 3 C = 60° c = ?
[#6] b = 13 c = 11 A = 60° a = ?
[#7] b = 20 c = 8 A = 60° a = ?
[#8] b = 11 c = 20 A = 60° a = ?
[#9] a = 8 b = 16 C = 60° c = ?
[#10] b = 15 c = 14 A = 60° a = ?
[#11] a = 3 b = 9 C = 60° c = ?
[#12] a = 17 b = 10 C = 60° c = ?
[#13] a = 7 b = 7 C = 60° c = ?
[#14] b = 5 c = 4 A = 60° a = ?
[#15] a = 4 b = 17 C = 60° c = ?
[#16] b = 16 c = 18 A = 60° a = ?

เฉลยแบบฝึกหัด Use the cosine rule

[#1] $c^2 = 12^2 + 12^2 - 2 \cdot 12 \cdot 12 \cdot \cos(60^\circ) = 144 + 144 - 288 \cdot 0.5 = 144$
$c = \sqrt{144} = 12$

[#2] $c^2 = 9^2 + 5^2 - 2 \cdot 9 \cdot 5 \cdot \cos(60^\circ) = 81 + 25 - 90 \cdot 0.5 = 61$
$c = \sqrt{61} = 7.8$

[#3] $c^2 = 14^2 + 2^2 - 2 \cdot 14 \cdot 2 \cdot \cos(60^\circ) = 196 + 4 - 56 \cdot 0.5 = 172$
$c = \sqrt{172} = 13.1$

[#4] $c^2 = 19^2 + 13^2 - 2 \cdot 19 \cdot 13 \cdot \cos(60^\circ) = 361 + 169 - 494 \cdot 0.5 = 283$
$c = \sqrt{283} = 16.8$

[#5] $c^2 = 18^2 + 3^2 - 2 \cdot 18 \cdot 3 \cdot \cos(60^\circ) = 324 + 9 - 108 \cdot 0.5 = 279$
$c = \sqrt{279} = 16.7$

[#6] $a^2 = 13^2 + 11^2 - 2 \cdot 13 \cdot 11 \cdot \cos(60^\circ) = 169 + 121 - 286 \cdot 0.5 = 147$
$a = \sqrt{147} = 12.1$

[#7] $a^2 = 20^2 + 8^2 - 2 \cdot 20 \cdot 8 \cdot \cos(60^\circ) = 400 + 64 - 320 \cdot 0.5 = 304$
$a = \sqrt{304} = 17.4$

[#8] $a^2 = 11^2 + 20^2 - 2 \cdot 11 \cdot 20 \cdot \cos(60^\circ) = 121 + 400 - 440 \cdot 0.5 = 301$
$a = \sqrt{301} = 17.3$

[#9] $c^2 = 8^2 + 16^2 - 2 \cdot 8 \cdot 16 \cdot \cos(60^\circ) = 64 + 256 - 256 \cdot 0.5 = 192$
$c = \sqrt{192} = 13.9$

[#10] $a^2 = 15^2 + 14^2 - 2 \cdot 15 \cdot 14 \cdot \cos(60^\circ) = 225 + 196 - 420 \cdot 0.5 = 211$
$a = \sqrt{211} = 14.5$

[#11] $c^2 = 3^2 + 9^2 - 2 \cdot 3 \cdot 9 \cdot \cos(60^\circ) = 9 + 81 - 54 \cdot 0.5 = 63$
$c = \sqrt{63} = 7.9$

[#12] $c^2 = 17^2 + 10^2 - 2 \cdot 17 \cdot 10 \cdot \cos(60^\circ) = 289 + 100 - 340 \cdot 0.5 = 219$
$c = \sqrt{219} = 14.8$

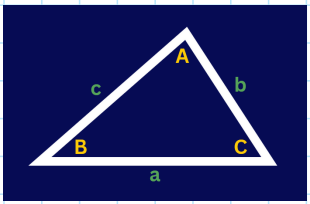
[#13] $c^2 = 7^2 + 7^2 - 2 \cdot 7 \cdot 7 \cdot \cos(60^\circ) = 49 + 49 - 98 \cdot 0.5 = 49$
$c = \sqrt{49} = 7$

[#14] $a^2 = 5^2 + 4^2 - 2 \cdot 5 \cdot 4 \cdot \cos(60^\circ) = 25 + 16 - 40 \cdot 0.5 = 21$
$a = \sqrt{21} = 4.6$

[#15] $c^2 = 4^2 + 17^2 - 2 \cdot 4 \cdot 17 \cdot \cos(60^\circ) = 16 + 289 - 136 \cdot 0.5 = 237$
$c = \sqrt{237} = 15.4$

[#16] $a^2 = 16^2 + 18^2 - 2 \cdot 16 \cdot 18 \cdot \cos(60^\circ) = 256 + 324 - 576 \cdot 0.5 = 292$
$a = \sqrt{292} = 17.1$

Find the area of the triangle



[#1] a = 4 b = 16 C = 45° AREA = ?
[#2] a = 9 b = 15 C = 30° AREA = ?
[#3] b = 7 c = 20 A = 30° AREA = ?
[#4] b = 5 c = 7 A = 30° AREA = ?
[#5] a = 6 b = 9 C = 30° AREA = ?
[#6] a = 3 b = 5 C = 45° AREA = ?
[#7] a = 10 b = 8 C = 45° AREA = ?
[#8] b = 15 c = 10 A = 30° AREA = ?
[#9] a = 18 b = 12 C = 45° AREA = ?
[#10] a = 11 b = 6 C = 30° AREA = ?
[#11] a = 12 b = 18 C = 45° AREA = ?
[#12] a = 16 c = 11 B = 60° AREA = ?

เฉลยแบบฝึกหัด Find the area of the triangle

[#1] AREA = $\frac{1}{2}$ ab sin(C) = 0.5 · 4 · 16 · sin(45°) = 22.6

[#2] AREA = $\frac{1}{2}$ ab sin(C) = 0.5 · 9 · 15 · sin(30°) = 33.75

[#3] AREA = $\frac{1}{2}$ bc sin(A) = 0.5 · 7 · 20 · sin(30°) = 35

[#4] AREA = $\frac{1}{2}$ bc sin(A) = 0.5 · 5 · 7 · sin(30°) = 8.75

[#5] AREA = $\frac{1}{2}$ ab sin(C) = 0.5 · 6 · 9 · sin(30°) = 13.5

[#6] AREA = $\frac{1}{2}$ ab sin(C) = 0.5 · 3 · 5 · sin(45°) = 5.3

[#7] AREA = $\frac{1}{2}$ ab sin(C) = 0.5 · 10 · 8 · sin(45°) = 28.3

[#8] AREA = $\frac{1}{2}$ bc sin(A) = 0.5 · 15 · 10 · sin(30°) = 37.5

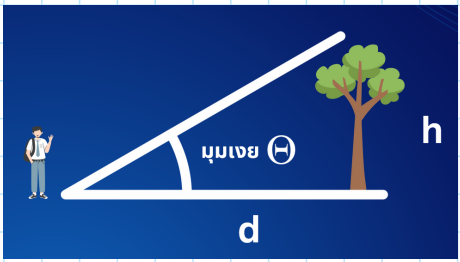
[#9] AREA = $\frac{1}{2}$ ab sin(C) = 0.5 · 18 · 12 · sin(45°) = 76.4

[#10] AREA = $\frac{1}{2}$ ab sin(C) = 0.5 · 11 · 6 · sin(30°) = 16.5

[#11] AREA = $\frac{1}{2}$ ab sin(C) = 0.5 · 12 · 18 · sin(45°) = 76.4

[#12] AREA = $\frac{1}{2}$ ac sin(B) = 0.5 · 16 · 11 · sin(60°) = 76.2

Find the height of the tree



[#1] d = 51 Θ = 30 h = ?
[#2] d = 45 Θ = 60 h = ?
[#3] d = 60 Θ = 60 h = ?
[#4] d = 39 Θ = 30 h = ?
[#5] d = 48 Θ = 30 h = ?
[#6] d = 27 Θ = 30 h = ?
[#7] d = 18 Θ = 45 h = ?
[#8] h = 42 Θ = 45 d = ?
[#9] h = 45 Θ = 45 d = ?
[#10] d = 21 Θ = 45 h = ?
[#11] d = 39 Θ = 60 h = ?
[#12] d = 36 Θ = 45 h = ?
[#13] d = 12 Θ = 45 h = ?
[#14] d = 24 Θ = 30 h = ?
[#15] d = 48 Θ = 60 h = ?
[#16] d = 9 Θ = 45 h = ?

เฉลยแบบฝึกหัด Find the height of the tree

[#1]
$h = d \cdot \tan(\Theta) = 51 \cdot \tan(30) = 51 \cdot \frac{\sqrt{3}}{3} = 17\sqrt{3}$

[#2] $h = d \cdot \tan(\Theta) = 45 \cdot \tan(60) = 45 \cdot \sqrt{3}$

[#3] $h = d \cdot \tan(\Theta) = 60 \cdot \tan(60) = 60 \cdot \sqrt{3}$

[#4]
$h = d \cdot \tan(\Theta) = 39 \cdot \tan(30) = 39 \cdot \frac{\sqrt{3}}{3} = 13\sqrt{3}$

[#5]
$h = d \cdot \tan(\Theta) = 48 \cdot \tan(30) = 48 \cdot \frac{\sqrt{3}}{3} = 16\sqrt{3}$

[#6]
$h = d \cdot \tan(\Theta) = 27 \cdot \tan(30) = 27 \cdot \frac{\sqrt{3}}{3} = 9\sqrt{3}$

[#7] $h = d \cdot \tan(\Theta) = 18 \cdot \tan(45) = 18 \cdot 1 = 18$

[#8] $d = \frac{h}{\tan(\Theta)} = \frac{42}{\tan(45)} = \frac{42}{1} = 42$

[#9] $d = \frac{h}{\tan(\Theta)} = \frac{45}{\tan(45)} = \frac{45}{1} = 45$

[#10] $h = d \cdot \tan(\Theta) = 21 \cdot \tan(45) = 21 \cdot 1 = 21$

[#11] $h = d \cdot \tan(\Theta) = 39 \cdot \tan(60) = 39 \cdot \sqrt{3}$

[#12] $h = d \cdot \tan(\Theta) = 36 \cdot \tan(45) = 36 \cdot 1 = 36$

[#13] $h = d \cdot \tan(\Theta) = 12 \cdot \tan(45) = 12 \cdot 1 = 12$

[#14]
$h = d \cdot \tan(\Theta) = 24 \cdot \tan(30) = 24 \cdot \frac{\sqrt{3}}{3} = 8\sqrt{3}$

[#15] $h = d \cdot \tan(\Theta) = 48 \cdot \tan(60) = 48 \cdot \sqrt{3}$

[#16] $h = d \cdot \tan(\Theta) = 9 \cdot \tan(45) = 9 \cdot 1 = 9$

Calculate the value without using a calculator

[#1] cos (15) =
[#2] sin (105) =
[#3] cos (105) =
[#4] sin (15) =
[#5] cos (75) =
[#6] sin (75) =

เฉลยแบบฝึกหัด Calculate the value without using a calculator

[#1] $\cos(15) = \cos(60 - 45) = \cos(60)\cos(45) + \sin(60)\sin(45)$

$$\frac{\sqrt{3}}{2}\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}\frac{1}{2} = \frac{(\sqrt{6}+\sqrt{2})}{4}$$

[#2] $\sin(105) = \sin(60 + 45) = \sin(60)\cos(45) + \sin(45)\cos(60)$

$$\frac{\sqrt{3}}{2}\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}\frac{1}{2} = \frac{(\sqrt{6}+\sqrt{2})}{4}$$

[#3] $\cos(105) = \cos(60 + 45) = \cos(60)\cos(45) - \sin(60)\sin(45)$

$$\frac{1}{2}\frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{2}\frac{\sqrt{2}}{2} = \frac{(\sqrt{2}-\sqrt{6})}{4}$$

[#4] $\sin(15) = \sin(60 - 45) = \sin(60)\cos(45) - \sin(45)\cos(60)$

$$\frac{\sqrt{3}}{2}\frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2}\frac{1}{2} = \frac{(\sqrt{6}-\sqrt{2})}{4}$$

[#5] $\cos(75) = \cos(45 + 30) = \cos(45)\cos(30) - \sin(45)\sin(30)$

$$\frac{\sqrt{2}}{2}\frac{\sqrt{3}}{2} - \frac{\sqrt{2}}{2}\frac{1}{2} = \frac{(\sqrt{6}+\sqrt{2})}{4}$$

[#6] $\sin(75) = \sin(45 + 30) = \sin(45)\cos(30) + \sin(30)\cos(45)$

$$\frac{\sqrt{2}}{2}\frac{\sqrt{3}}{2} + \frac{1}{2}\frac{\sqrt{2}}{2} = \frac{(\sqrt{6}+\sqrt{2})}{4}$$

Calculate the value without using a calculator

[#1] sin (90) + sin (0) =
[#2] sin (90) + sin (0) =
[#3] sin (90) + sin (0) =
[#4] sin (90) + sin (0) =
[#5] sin (90) + sin (0) =
[#6] sin (90) + sin (0) =




เฉลยแบบฝึกหัด Calculate the value without using a calculator

[#1] $2\sin(45)\cos(45) = \frac{2 \cdot \sqrt{2}}{2\sqrt{2}} = \frac{2 \cdot 2}{4} = 1$

[#2] $2\sin(45)\cos(45) = \frac{2 \cdot \sqrt{2}}{2\sqrt{2}} = \frac{2 \cdot 2}{4} = 1$

[#3] $2\sin(45)\cos(45) = \frac{2 \cdot \sqrt{2}}{2\sqrt{2}} = \frac{2 \cdot 2}{4} = 1$

[#4] $2\sin(45)\cos(45) = \frac{2 \cdot \sqrt{2}}{2\sqrt{2}} = \frac{2 \cdot 2}{4} = 1$

[#5] $2\sin(45)\cos(45) = \frac{2 \cdot \sqrt{2}}{2\sqrt{2}} = \frac{2 \cdot 2}{4} = 1$

[#6] $2\sin(45)\cos(45) = \frac{2 \cdot \sqrt{2}}{2\sqrt{2}} = \frac{2 \cdot 2}{4} = 1$