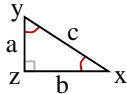


Lesson 8-2

Objective - To use basic trigonometry to solve for missing sides of right triangles.



Angle to Angle Relationships

180° Rule $m\angle x + m\angle y + m\angle z = 180^\circ$

Side to Side Relationships

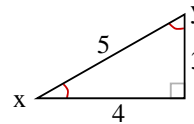
Pythagorean Theorem $a^2 + b^2 = c^2$

Angle to Side Relationships

Trigonometric Ratios

$\sin x = \frac{a}{c}$ $\cos x = \frac{b}{c}$ $\tan x = \frac{a}{b}$

sohcahtoa

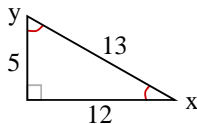


Sine = $\frac{\text{Opposite}}{\text{Hypotenuse}}$ $\sin x = \frac{3}{5}$ $\sin y = \frac{4}{5}$

Cosine = $\frac{\text{Adjacent}}{\text{Hypotenuse}}$ $\cos x = \frac{4}{5}$ $\cos y = \frac{3}{5}$

Tangent = $\frac{\text{Opposite}}{\text{Adjacent}}$ $\tan x = \frac{3}{4}$ $\tan y = \frac{4}{3}$

sohcahtoa



$\sin x = \frac{5}{13} \approx 0.385$ $\sin y = \frac{12}{13} \approx 0.923$

$\cos x = \frac{12}{13} \approx 0.923$ $\cos y = \frac{5}{13} \approx 0.385$

$\tan x = \frac{5}{12} \approx 0.417$ $\tan y = \frac{12}{5} = 2.4$

Trigonometric Ratio Tables

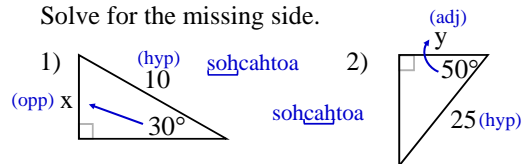
Angle	Sin	Cos	Tan	Angle	Sin	Cos	Tan
1	0.017	1	0.017	46	0.719	0.695	1.036
2	0.035	0.999	0.035	47	0.731	0.682	1.072
3	0.052	0.999	0.052	48	0.743	0.669	1.111
4	0.07	0.998	0.07	49	0.755	0.656	1.15
5	0.087	0.996	0.087	50	0.766	0.643	1.192
6	0.105	0.995	0.105	51	0.777	0.629	1.235
7	0.122	0.993	0.123	52	0.788	0.616	1.28
8	0.139	0.99	0.141	53	0.799	0.602	1.327
9	0.156	0.988	0.158	54	0.809	0.588	1.376
10	0.174	0.985	0.176	55	0.819	0.574	1.428
11	0.191	0.982	0.194	56	0.829	0.559	1.483
12	0.208	0.978	0.213	57	0.839	0.545	1.54
13	0.225	0.974	0.231	58	0.848	0.53	1.6
14	0.242	0.97	0.249	59	0.857	0.515	1.664
15	0.259	0.966	0.268	60	0.866	0.5	1.732
16	0.276	0.961	0.287	61	0.875	0.485	1.804
17	0.292	0.956	0.306	62	0.883	0.469	1.881
18	0.309	0.951	0.325	63	0.891	0.454	1.963
19	0.326	0.946	0.344	64	0.899	0.438	2.05
20	0.342	0.94	0.364	65	0.906	0.423	2.145

Use your trig table or calculator to find the given trigonometric ratios rounded to nearest thousandth.

- 1) $\sin 32^\circ \approx 0.530$ 6) $\tan 58^\circ \approx 1.600$
- 2) $\cos 50^\circ \approx 0.643$ 7) $\sin 30^\circ \approx 0.500$
- 3) $\tan 73^\circ \approx 3.271$ 8) $\cos 82^\circ \approx 0.139$
- 4) $\cos 15^\circ \approx 0.966$ 9) $\tan 52^\circ \approx 1.280$
- 5) $\sin 60^\circ \approx 0.866$ 10) $\cos 77^\circ \approx 0.225$

Using Trig Ratios to Solve Right Triangles

Solve for the missing side.



$\sin 30^\circ = \frac{x}{10}$

$(10)0.5 = \frac{x}{10} (10)$

$5 = x$

$\cos 50^\circ = \frac{y}{25}$

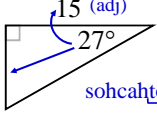
$(25)0.643 \approx \frac{y}{25} (25)$

$16.075 \approx y$

Lesson 8-2

Using Trig Ratios to Solve Right Triangles

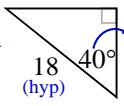
Solve for the missing side.

3) 

$\tan 27^\circ = \frac{x}{15}$

~~(15) 0.51 ≈ $\frac{x}{15}$ (15)~~

7.65 ≈ x

4) 

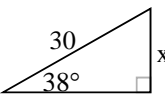
$\cos 40^\circ = \frac{y}{18}$

~~(18) 0.766 ≈ $\frac{y}{18}$ (18)~~

13.788 ≈ y

Using Trig Ratios to Solve Right Triangles

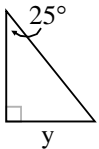
Solve for the missing side.

5) 

$\sin 38^\circ = \frac{x}{30}$

~~(30) 0.616 ≈ $\frac{x}{30}$ (30)~~

18.48 ≈ x

6) 

$\tan 25^\circ = \frac{y}{14}$

~~(14) 0.466 ≈ $\frac{y}{14}$ (14)~~

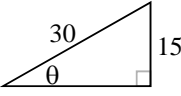
6.524 ≈ y

Use your trig table or calculator to find the missing angle α that has the given trig ratio.

<p>1) $\sin \alpha = 0.469$ $m\angle \alpha = 28^\circ$</p> <p>2) $\cos \alpha = 0.342$ $m\angle \alpha = 70^\circ$</p> <p>3) $\tan \alpha = 0.675$ $m\angle \alpha = 34^\circ$</p> <p>4) $\cos \alpha = 0.035$ $m\angle \alpha = 88^\circ$</p>	<p>5) $\tan \alpha = 1$ $m\angle \alpha = 45^\circ$</p> <p>6) $\cos \alpha = 0.981$ $m\angle \alpha = 11^\circ$</p> <p>7) $\sin \alpha = 0.72$ $m\angle \alpha = 46^\circ$</p> <p>8) $\tan \alpha = 8.146$ $m\angle \alpha = 83^\circ$</p>
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Using Trig Ratios to Solve Right Triangles

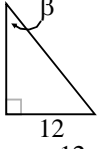
Solve for the missing side.

1) 

$\sin \theta = \frac{15}{30}$

$\sin \theta = 0.5$

$m\angle \theta = 30^\circ$

2) 

$\tan \beta = \frac{12}{20}$

$\tan \beta = 0.6$

$m\angle \beta \approx 31^\circ$