Sec. 5.1 - Primary and Reciprocal Trigonometric Relationships

Learning Goa: By the end of today, I will be able to solve triangle problems using the primary or reciprocal trigonometric relationships.

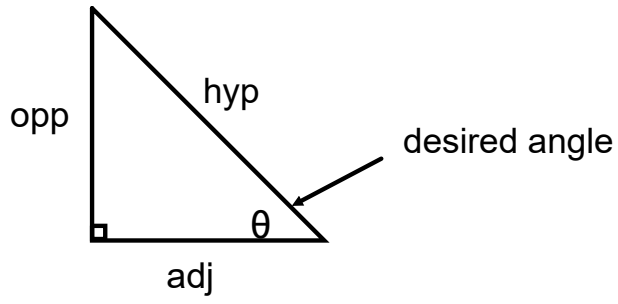
Nov 12-4:06 PM

I very kind person created something called the trigonometry tables. They determined that there is an angle attached to every ratio of sides. If the ratio of the sides is 0.5, then that coincides with an angle of 30°. The problem was making sure that we were all talking about the SAME ratio of sides.

The primary trigonometric ratios were born. By giving names to the ratios we were talking about ensured that everyone was on the same page.

Sine	Cosine	Tangent
$\sin(angle) = \frac{opp}{hyp}$	$\cos(angle) = \frac{adj}{hyp}$	$\tan(angle) = \frac{opp}{adj}$

Soh Cah Toa



May 27-11:38 AM

Trigonometry Table – Sine, Cosine, Tangent

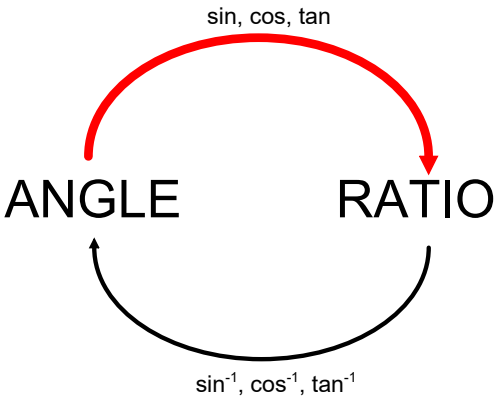
Soh Cah Toa

Angle	Sin	Cos	Tan	Angle	Sin	Cos	Tan
1	0.017	1.000	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	0.070	0.998	0.070	49	0.755	0.656	1.150
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	1.280
8	0.139	0.990	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	1.540
13	0.225	0.974	0.231	58	0.848	0.530	1.600
14	0.242	0.970	0.249	59	0.857	0.515	1.664
15	0.259	0.966	0.268	60	0.866	0.500	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	2.050
20	0.342	0.940	0.364	65	0.906	0.423	2.145
21	0.358	0.934	0.384	66	0.914	0.407	2.246
22	0.375	0.927	0.404	67	0.921	0.391	2.356
23	0.391	0.921	0.424	68	0.927	0.375	2.475
24	0.407	0.914	0.445	69	0.934	0.358	2.605
25	0.423	0.906	0.466	70	0.940	0.342	2.747
26	0.438	0.899	0.488	71	0.946	0.326	2.904
27	0.454	0.891	0.510	72	0.951	0.309	3.078
28	0.469	0.883	0.532	73	0.956	0.292	3.271
29	0.485	0.875	0.554	74	0.961	0.276	3.487
30	0.500	0.866	0.577	75	0.966	0.259	3.732
31	0.515	0.857	0.601	76	0.970	0.242	4.011
32	0.530	0.848	0.625	77	0.974	0.225	4.331
33	0.545	0.839	0.649	78	0.978	0.208	4.705
34	0.559	0.829	0.675	79	0.982	0.191	5.145
35	0.574	0.819	0.700	80	0.985	0.174	5.671
36	0.588	0.809	0.727	81	0.988	0.156	6.314
37	0.602	0.799	0.754	82	0.990	0.139	7.115
38	0.616	0.788	0.781	83	0.993	0.122	8.144
39	0.629	0.777	0.810	84	0.995	0.105	9.514
40	0.643	0.766	0.839	85	0.996	0.087	11.430
41	0.656	0.755	0.869	86	0.998	0.070	14.301
42	0.669	0.743	0.900	87	0.999	0.052	19.081
43	0.682	0.731	0.933	88	0.999	0.035	28.636
44	0.695	0.719	0.966	89	1.000	0.017	57.290
45	0.707	0.707	1.000	90	1.000	0.000	

The entire preceding table is also stored in your calculator.

Jan 6-10:56 AM

Calculators have mini Trig tables stored inside of them (sorta).



(arcsine, arccosine,arctan)
second function/shift sin,cos,tan

Angle TO ratio

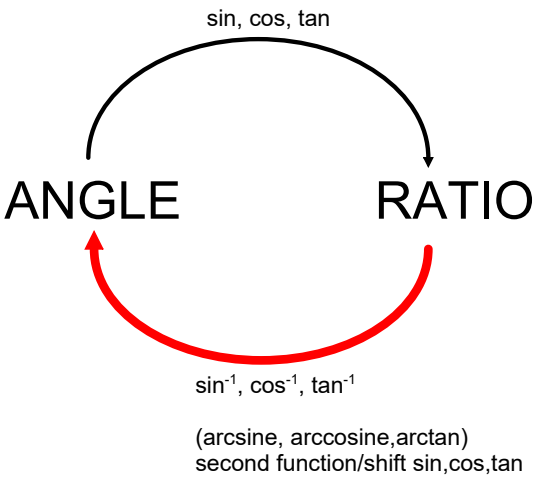
(a) sin (35°) =

(b) cos (45°) =

(c) tan (78°) =

May 28-11:48 AM

Calculators have mini Trig tables stored inside of them (sorta).



Ratio TO Angle

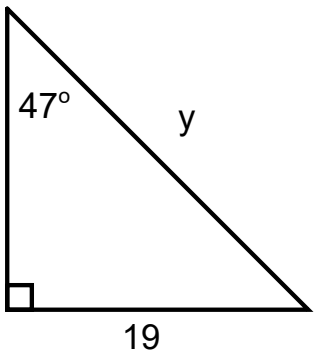
(a) sin (A) = 0.68

(b) cos (B) = 0.456

(c) tan (K) = 12.45

May 28-11:48 AM

Choose the most appropriate Trig Ratio, and use it to find the missing "y" value.



May 27-12:47 PM

Based on a given angle, proportions are formed between the sides.

No matter the size of the triangle, these proportions remain the same since the angle is unchanged.

The Primary Trigonometric Ratios

sine

$$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

cosine

$$\cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$

tangent

$$\tan\theta = \frac{\text{opposite}}{\text{adjacent}}$$

The Reciprocal Trigonometric Ratios

cosecant

$$\csc\theta = \frac{\text{hypotenuse}}{\text{opposite}}$$

secant

$$\sec\theta = \frac{\text{hypotenuse}}{\text{adjacent}}$$

cotangent

$$\cot\theta = \frac{\text{adjacent}}{\text{opposite}}$$

$$\csc\theta = \frac{1}{\sin\theta}$$

$$\sec\theta = \frac{1}{\cos\theta}$$

$$\cot\theta = \frac{1}{\tan\theta}$$

Remember, the given angle determines the label of each side.

Sep 9-9:01 AM

Example:

State the reciprocal trig ratios for angle θ

$$\sin\theta = \frac{2}{5}$$

$$\cos\theta = \frac{13}{12}$$

$$\tan\theta = \frac{3}{8}$$

Nov 11-1:55 PM

Determine the value of θ to the nearest degree:

a) $\csc\theta = 1.0568$ b) $\cot\theta = 4.5678$ c) $\sec\theta = 2.0987$

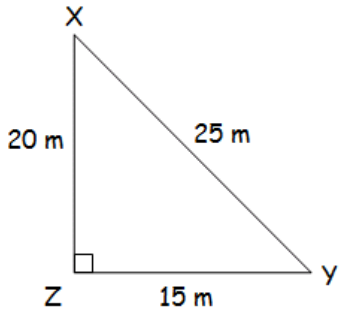
Sep 9-9:04 AM

Determine the following ratios to the nearest thousandth:

a) $\sec 54^\circ$ b) $\cot 80^\circ$ c) $\csc 12^\circ$

Sep 9-9:05 AM

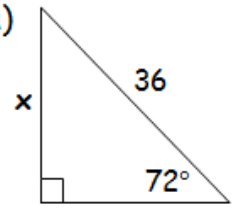
Determine the primary and reciprocal ratios for angle Y.



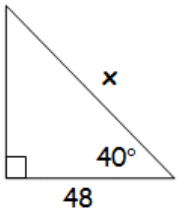
Sep 9-9:02 AM

Solve for the unknowns usingprimary or reciprocal ratios:

a)



b)



Sep 9-9:03 AM

Example:

From a position some distance away from the base of a flagpole, Jon estimates that the pole is 5m tall at an angle of elevation of 25 degrees. If Jon is 1.6m tall, use a reciprocal trig ratio to calculate how far he is from the base of the flagpole, (to one decimal place.) USE A DIAGRAM

Nov 5-10:22 AM

Homework

Page 281-2 #3-9,11, 18

Nov 5-10:27 AM