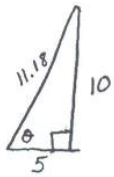


# HOMWORK SOLUTIONS...

## Primary Trig Ratios

1)



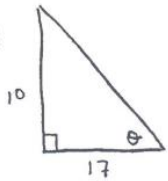
$$\begin{aligned}
 c^2 &= a^2 + b^2 \\
 c^2 &= 10^2 + 5^2 \\
 c^2 &= 100 + 25 \\
 c^2 &= 125 \\
 \boxed{c} &= \boxed{11.18}
 \end{aligned}$$

$$\begin{aligned}
 \sin \theta &= \frac{o}{h} \\
 &= \frac{10}{11.18} \\
 &= 0.89 \\
 &63.4^\circ
 \end{aligned}$$

$$\begin{aligned}
 \cos \theta &= \frac{a}{h} \\
 &= \frac{5}{11.18} \\
 &= 0.44 \\
 &63.4^\circ
 \end{aligned}$$

$$\begin{aligned}
 \tan \theta &= \frac{o}{a} \\
 &= \frac{10}{5} \\
 &= 2 \\
 &63.4^\circ
 \end{aligned}$$

2)



$$\begin{aligned}
 c^2 &= a^2 + b^2 \\
 &= 10^2 + 17^2 \\
 &= 100 + 289 \\
 &= 389 \\
 c &= 19.7
 \end{aligned}$$

$$\begin{aligned}
 \sin \theta &= \frac{o}{h} \\
 &= \frac{10}{19.7} \\
 &= 0.5070 \\
 &30.46^\circ
 \end{aligned}$$

$$\begin{aligned}
 \cos \theta &= \frac{a}{h} \\
 &= \frac{17}{19.7} \\
 &= 0.8629 \\
 &30.35^\circ
 \end{aligned}$$

$$\begin{aligned}
 \tan \theta &= \frac{o}{a} \\
 &= \frac{10}{17} \\
 &= 0.588 \\
 &30.46^\circ
 \end{aligned}$$

3)



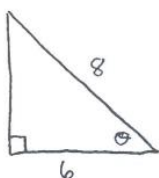
$$\begin{aligned}
 a^2 &= c^2 - b^2 \\
 &= 12^2 - 5^2 \\
 &= 144 - 25 \\
 a^2 &= 119 \\
 a &= 10.91
 \end{aligned}$$

$$\begin{aligned}
 \sin \theta &= \frac{o}{h} \\
 &= \frac{10.91}{12} \\
 &= 0.9091 \\
 &65.4^\circ
 \end{aligned}$$

$$\begin{aligned}
 \cos \theta &= \frac{a}{h} \\
 &= \frac{5}{12} \\
 &= 0.4167 \\
 &65.4^\circ
 \end{aligned}$$

$$\begin{aligned}
 \tan \theta &= \frac{o}{a} \\
 &= \frac{5}{10.91} \\
 &= 2.185 \\
 &65.4^\circ
 \end{aligned}$$

4)

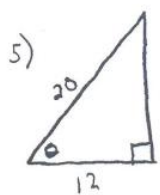


$$\begin{aligned}
 a^2 &= c^2 - b^2 \\
 &= 8^2 - 6^2 \\
 &= 64 - 36 \\
 a^2 &= 28 \\
 a &= 5.29
 \end{aligned}$$

$$\begin{aligned}
 \sin \theta &= \frac{o}{h} \\
 &= \frac{5.29}{8} \\
 &= 0.66 \\
 &41.4^\circ
 \end{aligned}$$

$$\begin{aligned}
 \cos \theta &= \frac{a}{h} \\
 &= \frac{6}{8} \\
 &= 0.75 \\
 &41.4^\circ
 \end{aligned}$$

$$\begin{aligned}
 \tan \theta &= \frac{o}{a} \\
 &= \frac{6}{5.29} \\
 &= 0.8817 \\
 &41.4^\circ
 \end{aligned}$$



$$a^2 = 20^2 - 12^2$$

$$a^2 = 400 - 144$$

$$a^2 = 256$$

$$a = 16$$

$$\sin \theta = \frac{o}{h}$$

$$= \frac{16}{20}$$

$$= 0.8$$

$$53.1^\circ$$

$$\cos \theta = \frac{a}{h}$$

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

$$= 0.6$$

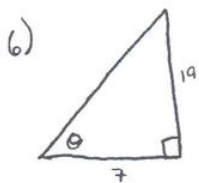
$$53.1^\circ$$

$$\tan \theta = \frac{o}{a}$$

$$= \frac{16}{12}$$

$$= 1.33$$

$$53.1^\circ$$



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

$$= 19^2 + 7^2$$

$$= 361 + 49$$

$$c^2 = 410$$

$$c = 20.25$$

$$\sin \theta = \frac{o}{h}$$

$$= \frac{19}{20.25}$$

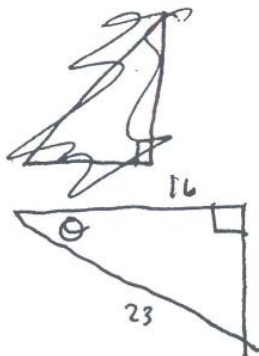
$$\cos \theta = \frac{a}{h}$$

$$= \frac{7}{20.25}$$

$$\tan \theta = \frac{o}{a}$$

$$= \frac{19}{7}$$

7)



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

$$a = \sqrt{c^2 - b^2}$$

$$a = \sqrt{23^2 - 16^2}$$

$$a = \sqrt{529 - 256}$$

$$a = \sqrt{273}$$

$$a = 16.5$$

$$\sin \theta = \frac{o}{h}$$

$$= \frac{16.5}{23}$$

$$= 0.71$$

$$\theta = 45.8$$

$$\cos \theta = \frac{16}{23}$$

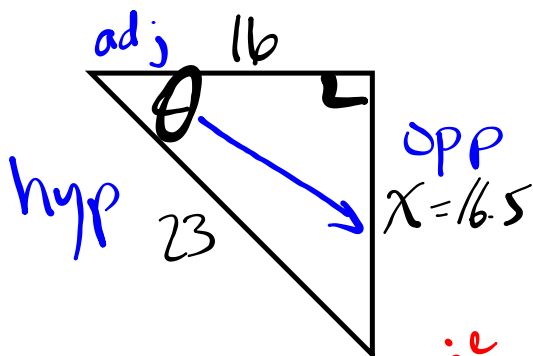
$$= 0.6$$

$$\theta = 45.9$$

$$\tan \theta = \frac{o}{a} = \frac{16.5}{16}$$

$$= 1.03$$

$$\theta = 45.9$$



$$\sqrt{x^2} = \sqrt{23^2 - 16^2}$$

$$x = 16.5$$

*Sine*  
SOH

$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$= \frac{16.5}{23}$$

$$= 0.7174$$

*Cosine*  
CAH

$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

$$= \frac{16}{23}$$

$$= 0.6957$$

*Tangent*  
TOA

$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

$$= \frac{16.5}{16}$$

$$= 1.0313$$

### Trigonometric Table:

Degrees	Radian Measure	Sin	Cos	Tan	Degrees	Radian Measure	Sin	Cos	Tan
0	0.00000	0.00000	1.00000	0.00000	46	0.80285	0.71934	0.69466	1.03553
1	0.01745	0.01745	0.99985	0.01746	47	0.82030	0.73135	0.68200	1.07237
2	0.03491	0.03490	0.99939	0.03492	48	0.83776	0.74314	0.66913	1.11061
3	0.05236	0.05234	0.99863	0.05241	49	0.85521	0.75471	0.65606	1.15037
4	0.06981	0.06976	0.99756	0.06993	50	0.87266	0.76604	0.64279	1.19175
5	0.08727	0.08716	0.99619	0.08749	51	0.89012	0.77715	0.62932	1.23490
6	0.10472	0.10453	0.99452	0.10510	52	0.90757	0.78801	0.61566	1.27994
7	0.12217	0.12187	0.99255	0.12278	53	0.92502	0.79864	0.60182	1.32704
8	0.13963	0.13917	0.99027	0.14054	54	0.94248	0.80902	0.58779	1.37638
9	0.15708	0.15643	0.98769	0.15838	55	0.95993	0.81915	0.57358	1.42815
10	0.17453	0.17365	0.98481	0.17633	56	0.97738	0.82904	0.55919	1.48256
11	0.19199	0.19081	0.98163	0.19438	57	0.99484	0.83867	0.54464	1.53986
12	0.20944	0.20791	0.97815	0.21256	58	1.01229	0.84805	0.52992	1.60033
13	0.22689	0.22495	0.97437	0.23087	59	1.02974	0.85717	0.51504	1.66428
14	0.24435	0.24192	0.97030	0.24933	60	1.04720	0.86603	0.50000	1.73205
15	0.26180	0.25882	0.96593	0.26795	61	1.06465	0.87462	0.48481	1.80405
16	0.27925	0.27564	0.96126	0.28675	62	1.08210	0.88295	0.46947	1.88073
17	0.29671	0.29237	0.95630	0.30573	63	1.09956	0.89101	0.45399	1.96261
18	0.31416	0.30902	0.95106	0.32492	64	1.11701	0.89879	0.43837	2.05030
19	0.33161	0.32557	0.94552	0.34433	65	1.13446	0.90631	0.42262	2.14451
20	0.34907	0.34202	0.93969	0.36397	66	1.15192	0.91355	0.40674	2.24604
21	0.36652	0.35837	0.93358	0.38386	67	1.16937	0.92050	0.39073	2.35585
22	0.38397	0.37461	0.92718	0.40403	68	1.18682	0.92718	0.37461	2.47509
23	0.40143	0.39073	0.92050	0.42447	69	1.20428	0.93358	0.35837	2.60309
24	0.41888	0.40674	0.91355	0.44523	70	1.22173	0.93969	0.34202	2.74748
25	0.43633	0.42262	0.90631	0.46631	71	1.23918	0.94552	0.32557	2.90421
26	0.45379	0.43837	0.89879	0.48773	72	1.25664	0.95106	0.30902	3.07768
27	0.47124	0.45399	0.89101	0.50953	73	1.27409	0.95630	0.29237	3.27065
28	0.48869	0.46947	0.88295	0.53171	74	1.29154	0.96126	0.27564	3.48741
29	0.50615	0.48481	0.87462	0.55431	75	1.30900	0.96593	0.25882	3.73205
30	0.52360	0.50000	0.86603	0.57735	76	1.32645	0.97030	0.24192	4.01078
31	0.54105	0.51504	0.85717	0.60086	77	1.34390	0.97437	0.22495	4.33148
32	0.55851	0.52992	0.84805	0.62487	78	1.36136	0.97815	0.20791	4.70463
33	0.57596	0.54464	0.83867	0.64941	79	1.37881	0.98163	0.19081	5.14453
34	0.59341	0.55919	0.82904	0.67451	80	1.39626	0.98481	0.17365	5.67128
35	0.61087	0.57358	0.81915	0.70021	81	1.41372	0.98769	0.15643	6.31375
36	0.62832	0.58779	0.80902	0.72654	82	1.43117	0.99027	0.13917	7.11537
37	0.64577	0.60182	0.79864	0.75355	83	1.44862	0.99255	0.12187	8.14433
38	0.66323	0.61566	0.78801	0.78129	84	1.46608	0.99452	0.10453	9.51436
39	0.68068	0.62932	0.77715	0.80978	85	1.48353	0.99619	0.08716	11.43005
40	0.69813	0.64279	0.76604	0.83910	86	1.50098	0.99756	0.06976	14.30067
41	0.71558	0.65606	0.75471	0.86929	87	1.51844	0.99863	0.05234	19.08114
42	0.73304	0.66913	0.74314	0.90040	88	1.53589	0.99939	0.03490	28.63625
43	0.75049	0.68200	0.73135	0.93252	89	1.55334	0.99985	0.01745	57.28996
44	0.76794	0.69466	0.71934	0.96569	90	1.57080	1.00000	0.00000	
45	0.78540	0.70711	0.70711	1.00000					

**EXAMPLE - Finding an unknown side**

adj  $44^\circ$   
 $x$   
 $9.21$   
 hyp  $12.8 \text{ cm}$

$$12.8 \cos 44^\circ = \frac{x}{12.8} (12.8)$$

$$9.21 \text{ km} = x$$

SOH LAH TOA

$23^\circ$   
 $8$  opp  
 $y$  hyp

$$y \sin 23^\circ = \frac{8}{y} y$$

swp  $\rightarrow$

$$y = \frac{8}{\sin 23^\circ}$$

$$y = 20.5$$

**EXAMPLE - Finding an unknown angle**

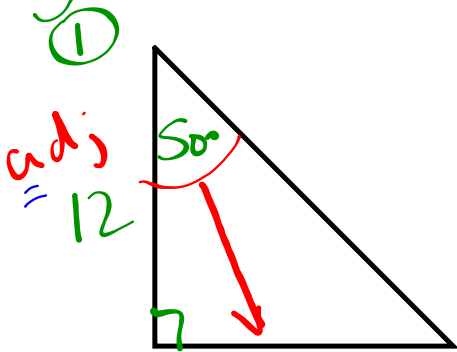
adj  $14.3 \text{ m}$   
 $\theta$   
 opp  $18.1 \text{ m}$

Inverse Trig (2nd)  
 $\sin^{-1}$   $\cos^{-1}$   $\tan^{-1}$

$$\tan^{-1} \tan \theta = \frac{18.1}{14.3}$$

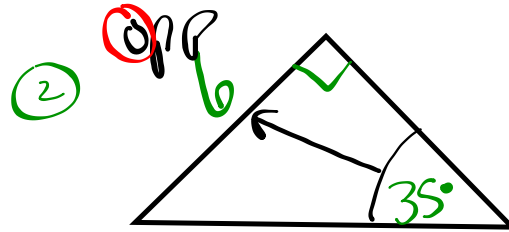
$$\theta = 52^\circ$$

Your turn...



$$12 \tan 50^\circ = \frac{x(12)}{12}$$

$$14.3 = x$$



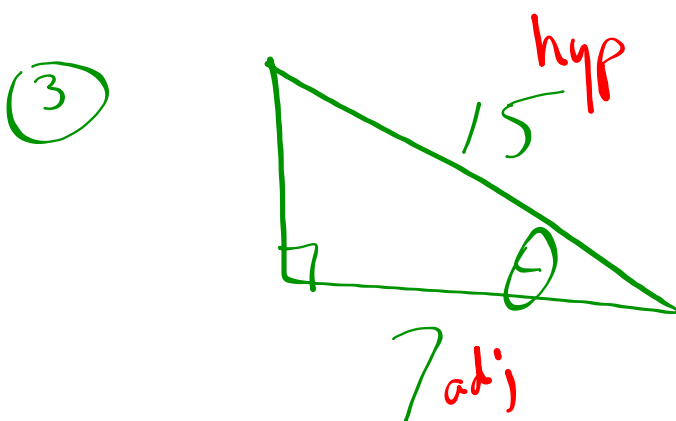
SOH CAH TOA

$$\sin 35^\circ = \frac{6}{y}$$

swap → y

$$y = \frac{6}{\sin 35^\circ}$$

$$y = 10.5$$



$$\cos^{-1} \cos \theta = \cos^{-1} \left( \frac{7}{15} \right)$$

$$\theta = 62^\circ$$

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# HOMEWORK...

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 Worksheet - Primary Trig Find an Angle.pdf



## Attachments

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Worksheet - Primary Trig Find a Side.pdf

Worksheet - Primary Trig Find an Angle.pdf