

TRIGONOMETRY EXAM 2B

Calculators are required. Answer to nearest hundredth, or tenth of $^{\circ}$.
 Show all work as necessary. Turn in work sheets. **Circle answers!**

In 1-2, solve the right triangle with right angle at C.

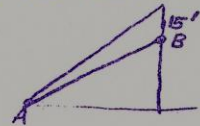
1. $a = 8.31$	2. $a = 2420$
$B = 21.63^{\circ}$	$C = 1835$

In 3-7, identify the triangle as SSS, SAS, ASA or SSA, and solve the triangle completely.

3. $\angle A = 47^{\circ}$	4. $a = 17$	5. $a = 47$	6. $a = 31.5$	7. $a = 31.5$
$\angle C = 112^{\circ}$	$b = 50$	$b = 25$	$b = 51.8$	$b = 75.7$
$\angle B = 81$	$c = 45$	$\angle C = 15.3^{\circ}$	$\angle A = 33.7^{\circ}$	$\angle A = 33.7^{\circ}$

8. From a window 25 m. above the ground the angle of elevation to the top of a tower is $24^{\circ} 20'$ and the angle of depression to the bottom of the tower is $14^{\circ} 40'$. Find the height of the tower.

9. From a point A the angle of elevation to the top of a building is 54° . From the same point A to a window B which is 15' from the top of the building, the angle of elevation is 42° . How tall is the building?



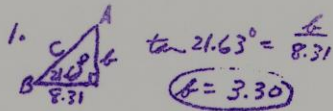
Prove the identities, as in class:

10. $\tan \theta + \cot \theta = \sec \theta \csc \theta$.

11. $\frac{\sin x}{1 + \cos x} + \frac{1 + \cos x}{\sin x} = 2 \csc x$

12.

TR16 EXAM 2B Solutions



1. $\tan 21.63^\circ = \frac{b}{8.31}$
 $b = 3.30$
 $\angle A = 90^\circ - 21.63^\circ$
 $\angle A = 68.37^\circ$
 $\sin 21.63^\circ = \frac{b}{c}$
 $c = \frac{3.30}{\sin 21.63^\circ}$
 $c = 8.94$

2. $a = 2420$
 $c = 1835$
 $\angle C = 90^\circ$
 No Sol. since $a > c$
 Hypotenuse is not largest side.

3. $\angle A = 47^\circ$
 $\angle C = 112^\circ$
 $b = 81$
 $\angle B = 180 - (112 + 47)$
 $\angle B = 21^\circ$
 ASA Law of Sines.
 $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$
 $\frac{\sin 47^\circ}{a} = \frac{\sin 21^\circ}{81} = \frac{\sin 112^\circ}{c}$
 $a = \frac{81 \sin 47^\circ}{\sin 21^\circ}$
 $c = \frac{81 \sin 112^\circ}{\sin 21^\circ}$
 $a = 165.30$
 $c = 209.57$

4. $a = 17$ (Do NOT USE LAW OF SINES FOR $\angle B$)
 $b = 50$
 $c = 45$
 SSS (LAW OF COSINES, THEN SINES)

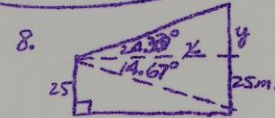
$\cos \angle A = \frac{b^2 + c^2 - a^2}{2bc} = \frac{50^2 + 45^2 - 17^2}{2(50)(45)}$
 $\angle A = 19.72^\circ$
 $\frac{\sin 19.72^\circ}{17} = \frac{\sin \angle C}{45}$
 $\angle C = 96.99^\circ$
 $\angle B = 180 - (19.72 + 96.99)$
 $\angle B = 63.29^\circ$
 $\sin C = \frac{45 \sin 19.72^\circ}{17}$
 $c = 63.29^\circ$

5. SAS Law of Cosines.
 $c^2 = a^2 + b^2 - 2ab \cos \angle C$
 $c^2 = 47^2 + 25^2 - 2(47)(25) \cos 15.3^\circ$
 $c^2 = 567.29$
 $c = 23.82$
 $\frac{\sin 15.3^\circ}{23.82} = \frac{\sin B}{25}$
 $\angle B = 16.8^\circ$
 $\angle A = 180 - (15.3 + 16.8)$
 $\angle A = 148.6^\circ$

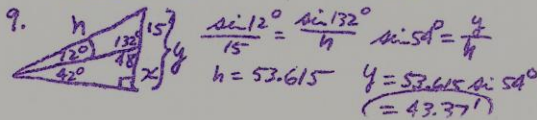
6. SSA Possibly two cases. Law of Sines or Cosines.

$\frac{\sin 33.7^\circ}{31.5} = \frac{\sin \angle B}{51.8}$
 $\angle B = 65.84^\circ$ or 114.16°
 $A + B_1 = 99.54$
 $A + B_2 = 147.86$
 $\angle C_1 = 80.46^\circ$
 $\angle C_2 = 32.14^\circ$
 $\frac{\sin 33.7^\circ}{31.5} = \frac{\sin 80.46^\circ}{c_1}$
 $\frac{\sin 33.7^\circ}{31.5} = \frac{\sin 32.14^\circ}{c_2}$
 $c_1 = 55.99$
 $c_2 = 30.20$

7. SSA (Possibly two) Again.
 $\frac{\sin 33.7^\circ}{31.5} = \frac{\sin B}{75.7}$
 $\angle B = 1.333$
 No Solution.



8. $\tan 14.67^\circ = \frac{25}{x}$
 $x = \frac{25}{\tan 14.67^\circ} = 95.566$
 $\tan 24.33^\circ = \frac{y}{95.566 + 25}$
 $y = 43.21$
 Height = 68.21m



9. $\frac{\sin 12^\circ}{15} = \frac{\sin 132^\circ}{h}$
 $h = 53.615$
 $\sin 54^\circ = \frac{y}{h}$
 $y = 53.615 \sin 54^\circ$
 $y = 43.371$

10. LHS = $\frac{\sin \theta + \cos \theta}{\cos \theta + \sin \theta}$
 $= \frac{\sin^2 \theta + \cos^2 \theta}{\cos \theta + \sin \theta}$
 $= \frac{1}{\cos \theta + \sin \theta}$
 $= \frac{1}{\cos \theta} \cdot \frac{1}{1 + \tan \theta}$
 $= \sec \theta \csc \theta = RHS$

11. LHS = $\frac{\sin^2 x + 1 + 2 \cos x + \cos^2 x}{(1 + \cos x)(\sin x)}$
 $= \frac{2 + 2 \cos x}{(1 + \cos x)(\sin x)}$
 $= \frac{2}{\sin x} = 2 \csc x = RHS$