Saturday, April 21, 2018
5:21 PM

Oblique Triangles Review Sheet
(Answers provided)

Name KEY

Per. _____

Use the given information to **A)** decide *how many* triangles exist and **B)** *solve* the triangles that do exist. If 2 solutions exist, give both sets of missing sides and angles. Round to the hundredths place

1. $B = 110°, C = 30°, c = 10.5$
2. $A = 130°, a = 50, b = 30$
3. $C = 50°, a = 25, c = 22$
4. $B = 150°, a = 64, b = 10$
5. $a = 6, b = 9, C = 45°$
6. $a = 80, b = 60, c = 100$

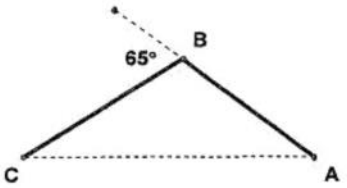
Find the area of the triangle having the given information below:

7. $a = 15, b = 8, c = 10$
8. $B = 80°, c = 8, a = 4$

Solve these word problems. Round lengths to the nearest tenth and angles to the nearest degree.

9. Two planes leave an airport at approximately the same time. One is flying 425 m.p.h. at a bearing of $N\ 5°\ W$ and the other is flying 530 m.p.h. at a bearing of $N\ 67°\ E$. Determine the distance between the planes after they have been in the air for two hours.

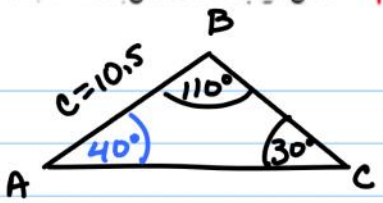
10. To approximate the length of a marsh, a surveyor walks 425 meters from point A to point B (as shown). The surveyor then turns 65° and walks 300 meters to point C. Approximate the distance AC across the marsh.



11. A triangular parcel of ground has sides with lengths 725 feet, 650 feet, and 575 feet. Find the measure of the largest angle on this lot.

Use the given information to **A)** decide *how many* triangles exist and **B)** *solve* the triangles that do exist. If 2 solutions exist, give both sets of missing sides and angles. Round to the hundredths

1. $B = 110°, C = 30°, c = 10.5$



a) SAA - 1 Triangle

b) $A = 180° - B - C$

$A = 180° - 110° - 30°$

$A = 40°$

$\frac{c}{\sin C} = \frac{b}{\sin B}$

$\frac{10.5}{\sin 30°} = \frac{b}{\sin 110°}$

$b = \frac{10.5 \sin 110°}{\sin 30°}$

$b \approx 19.73$

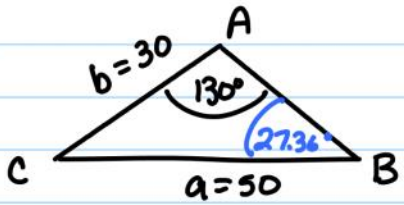
$\frac{c}{\sin C} = \frac{a}{\sin A}$

$\frac{10.5}{\sin 30°} = \frac{a}{\sin 40°}$

$a = \frac{10.5 \sin 40°}{\sin 30°}$

$a \approx 13.50$

2. $A = 130°, a = 50, b = 30$



a) SSA

Obtuse ∠

1 or ~~0~~ Triangle

b) $\frac{a}{\sin A} = \frac{b}{\sin B}$

$\frac{50}{\sin 130°} = \frac{30}{\sin B}$

$\sin B = \frac{30 \sin 130°}{50}$

$\sin^{-1}(.4596) = B$

$B \approx 27.36°$

$C = 180° - A - B$

$C = 180° - 130° - 27.36°$

$C \approx 22.64°$

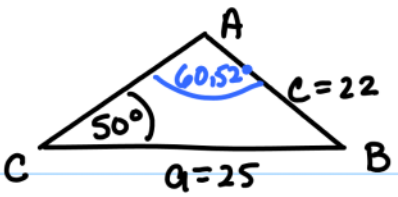
$\frac{a}{\sin A} = \frac{c}{\sin C}$

$\frac{50}{\sin 130°} = \frac{c}{\sin 22.64°}$

$c = \frac{50 \sin 22.64°}{\sin 130°}$

$c \approx 25.13$

3. $C = 50°, a = 25, c = 22$



a) SSA, given acute ∠

0, 1, or 2 Δs

b) 1st Δ

$\frac{a}{\sin A} = \frac{c}{\sin C}$

$\frac{25}{\sin A} = \frac{22}{\sin 50°}$

$\sin A = \frac{25 \sin 50°}{22}$

$\sin^{-1}(.8705) = A$

$A \approx 60.52°$

$B = 180° - A - C$

$B = 180° - 60.52° - 50°$

$B \approx 69.48°$

$\frac{b}{\sin B} = \frac{c}{\sin C}$

$\frac{b}{\sin 69.48°} = \frac{22}{\sin 50°}$

$b = \frac{22 \sin 69.48°}{\sin 50°}$

$b \approx 26.90$

2nd Δ

$\theta' = 60.52°$

$A = 180° - 60.52°$

$A = 119.48°$

$B = 180° - A - C$

$B = 180° - 119.48° - 50°$

$B = 10.52°$

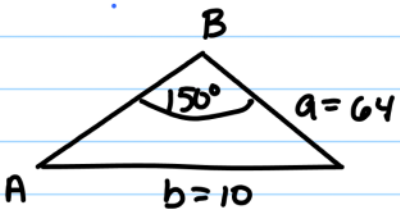
$\frac{b}{\sin B} = \frac{c}{\sin C}$

$\frac{b}{\sin 10.52°} = \frac{22}{\sin 50°}$

$b = \frac{22 \sin 10.52°}{\sin 50°}$

$b \approx 5.24$

4. $B = 150°, a = 64, b = 10$



a) SSA

given obtuse ∠

0 or 1 triangles

$\frac{a}{\sin A} = \frac{b}{\sin B}$

$\frac{64}{\sin A} = \frac{10}{\sin 150°}$

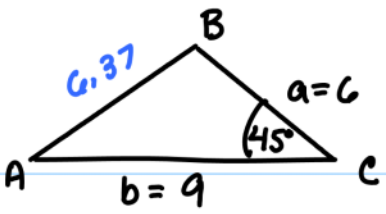
$\sin A = \frac{64 \sin 150°}{10}$

$\sin^{-1}(3.2^{*}) = A$

* outside of the range of sin

no solution

5. $a=6, b=9, C=45°$



a) SAS

1 SOLUTION

b) $c^2 = a^2+b^2-2ab\cos C$

$c^2 = 6^2+9^2-2(6)(9)\cos 45°$

$c^2 = 40.6325$

$c \approx 6.37$ ← STO

* use Law of Sines to find smallest ∠

$\frac{a}{\sin A} = \frac{c}{\sin C}$

$\frac{6}{\sin A} = \frac{6.37}{\sin 45°}$

$\sin A = \frac{6\sin 45°}{6.37}$

$\sin^{-1}(.6656) = A$

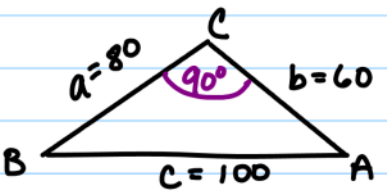
$A \approx 41.73°$

$B = 180° - A - C$

$B = 180° - 41.73° - 45°$

$B \approx 93.27°$

6. $a=80, b=60, c=100$



a) SSS 1 Δ

b) * use law of cosines to find largest ∠ 1st

$\cos C = \frac{a^2+b^2-c^2}{2ab}$

$\cos C = \frac{(80)^2+(60)^2-(100)^2}{2(80)(60)}$

$\cos C = 0$

$\cos^{-1}(0) = C$

$C = 90°$

* use Law of Sines to find smallest ∠

$\frac{c}{\sin C} = \frac{b}{\sin B}$

$\frac{100}{\sin 90°} = \frac{60}{\sin B}$

$\sin B = \frac{60\sin 90°}{100}$

$\sin^{-1}(.6) = B$

$B \approx 36.87°$

$A = 180° - B - C$

$A = 180° - 36.87° - 90°$

$A \approx 53.13°$

Find the area of the triangle having the given information below:

7. $a=15, b=8, c=10$

$s = \frac{a+b+c}{2}$

$s = \frac{15+8+10}{2}$

$s = 16.5$

Area $= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{16.5(16.5-15)(16.5-8)(16.5-10)}$

$= \sqrt{1367.4375}$

$= 36.98$ sq units

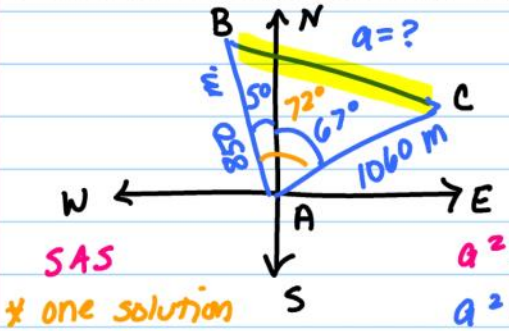
8. $B=80°, c=8, a=4$

Area $= \frac{1}{2} ac \sin B$

Area $= \frac{1}{2}(4)(8) \sin 80° = 15.76$ sq units

Solve these word problems. Round lengths to the nearest tenth and angles to the nearest degree.

9. Two planes leave an airport at approximately the same time. One is flying 425 m.p.h. at a bearing of $N\ 5°\ W$ and the other is flying 530 m.p.h. at a bearing of $N\ 67°\ E$. Determine the distance between the planes after they have been in the air for two hours.



425 mph (2 hrs) = 850 miles

530 mph (2 hrs) = 1060 miles

$A = 67° + 5° = 72°$

SAS

* one solution

$a^2 = b^2 + c^2 - 2bc \cos A$

$a^2 = (1060)^2 + (850)^2 - 2(1060)(850) \cos 72°$

$a^2 = 1,289,251.376$

$a =$ 1135.5 miles apart

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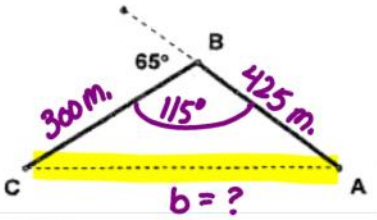


$b^2 = a^2 + c^2 - 2ac\cos B$

$b^2 = 300^2 + 425^2 - 2(300)(425)\cos 115°$

$b^2 = 378,392.66$

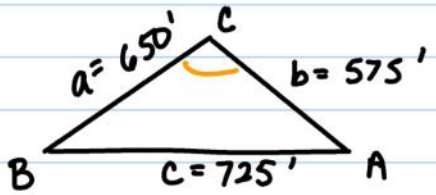
$b \approx 615.1$ meters

SAS - 1 solution

$B = 180° - 65°$

$B = 115°$

11. A triangular parcel of ground has sides with lengths 725 feet, 650 feet, and 575 feet. Find the measure of the largest angle on this lot.



* 1st use Law of Cosines to find largest ∠

$\cos C = \frac{a^2 + b^2 - c^2}{2ab}$

$\cos C = \frac{(650)^2 + (575)^2 - (725)^2}{2(650)(575)}$

$\cos^{-1}(.3043) = C$

STO

$C \approx 72.3°$