

FOR the QUIZ....

- You will have the entire block.
- You will be allowed/provided with a trig table (for angles between 0 and 90)
- You will be allowed a basic 5-function calculator.

1. Find the exact value of each inverse function in degrees.

(a) $\tan^{-1}\left(-\frac{\sqrt{3}}{3}\right)$

-30°

(b) $\arccos\left(\frac{1}{2}\right)$

60°

(c) $\arcsin -1$

-90°

(d) $\cos^{-1}(-1)$

180°

(e) $\sin\left(\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right)\right)$
 $\sin 135^\circ$
 45° ref

$\frac{\sqrt{2}}{2}$

(f) $\sin\left(\arctan\left(\frac{1}{7}\right)\right)$



8.13°

3. Find all (approximate) solutions to the following equations between 0 and 360. The table may be handy.

(a) $\sin x = .6018$

pos sin
 Q1, Q2

$37^\circ, 143^\circ$

(b) $\cos x = -.7660$

Q2
 Q3
 Ref $\angle = 40$

$140^\circ, 220^\circ$

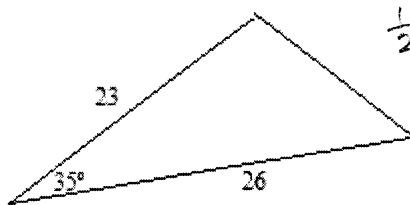
(c) $\tan x = \text{undefined}$

0 in denom.
 $\cos = 0$
 90
 270

$90^\circ, 270^\circ$

4. Find the approximate area of each figure below. Round to two decimal places.

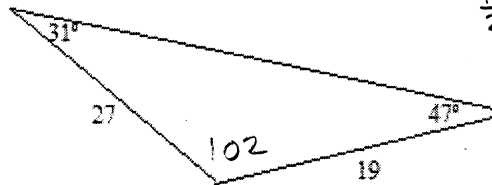
(a)



$\frac{1}{2}(23)(26)(\sin 35)$
 $299 \sin 35$
 $299(.5736)$

171.51 u^2

(b)

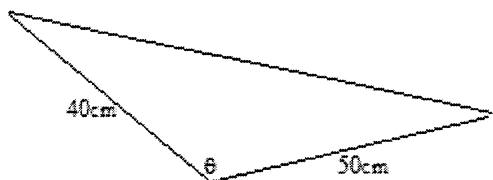


$180 - (31 + 47) = 102^\circ$

$\frac{1}{2}(19)(27)\sin 102$
 $256.5 \sin 102$
 Ref $\angle = 78$
 $265(.9781)$

259.2 u^2

5. The triangle below has area 829 cm^2 . Write an equation and find all possible values of θ



$\frac{1}{2}(40)(50)\sin \theta = 829$

$1000 \sin \theta = 829$

$\sin \theta = \frac{829}{1000}$

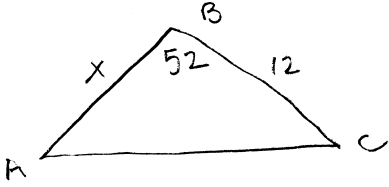
$\sin \theta = .829$

$\theta \approx 56^\circ$ And

$180 - 56 = 124^\circ$

$56^\circ, 124^\circ$

6. $\triangle ABC$ has area 47.28. $\angle B = 52^\circ$ and $BC = 12$. Find the approximate length of BA .



$$\frac{1}{2} (12)(x) (\sin 52) = 47.28$$

$$(6x) \sin 52 = 47.28$$

$$(6x)(.788) = 47.28$$

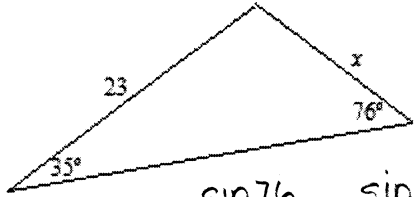
$$4.728x = 47.28$$

$$x = 10$$

$$\underline{BA = 10}$$

7. Find x in each of figure below. Round to two decimal places.

(a)



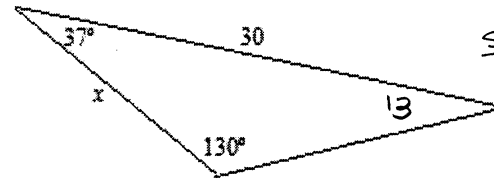
$$\frac{\sin 76}{23} = \frac{\sin 35}{x}$$

$$\frac{23 \sin 35}{\sin 76} = x$$

$$\frac{13.1923}{.9703}$$

$$\underline{x = 13.6}$$

(b)



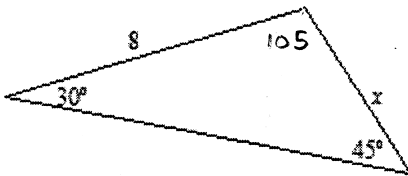
$$\frac{\sin 130}{30} = \frac{\sin 37}{x}$$

$$\frac{\sin 130 (30)}{\sin 130}$$

$$\frac{6.7485}{.766}$$

$$\underline{8.8 = x}$$

8. Find the exact value of x in the triangle below.



$$\frac{\sin 45}{8} = \frac{\sin 30}{x}$$

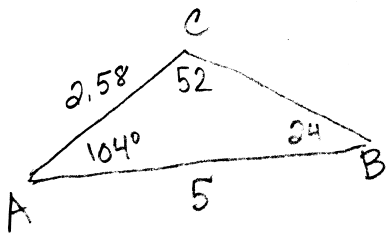
$$\frac{\sin 30 (8)}{\sin 45} = \frac{\frac{1}{2} (8)}{\frac{\sqrt{2}}{2}}$$

$$= \frac{4}{\frac{\sqrt{2}}{2}} = \frac{8}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$$

$$\frac{8\sqrt{2}}{2} = 4\sqrt{2}$$

$$\underline{4\sqrt{2}}$$

9. In triangle $\triangle ABC$, $c = 5$, $\angle B = 24^\circ$ and $\angle C = 52^\circ$. Find all the remaining sides and angles.



$$\angle A = 104^\circ$$

$$b = 2.58$$

$$\underline{\angle A = 104}$$

$$\underline{b = 2.58}$$

$$\underline{a = 6.16}$$

$$\textcircled{1} \frac{\sin 52}{5} = \frac{\sin 24}{b}$$

$$\frac{\sin 24 (5)}{\sin 52} = b$$

$$\frac{2.0335}{.788} = b$$

$$\textcircled{2} \frac{\sin 52}{5} = \frac{\sin 104}{a}$$

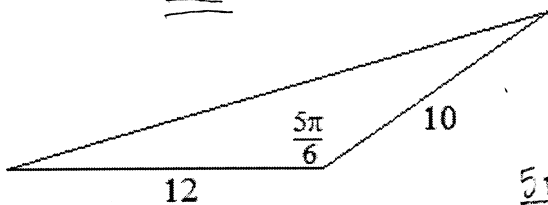
$$\Rightarrow \text{ref } \angle = 76^\circ$$

$$\frac{\sin 76 (5)}{\sin 52} = a$$

$$\frac{.9703 (5)}{.788} = 6.16 = a$$

can also use
L of C to find
last side

10. Find the exact area of each figure below.



$$\frac{1}{2} (12 \cdot 10) \sin \frac{5\pi}{6}$$

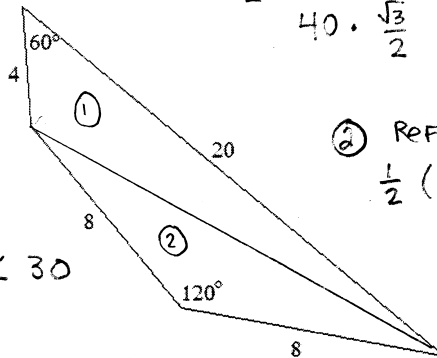
$$60 \sin 150$$

$$60 \left(\frac{1}{2}\right)$$

$$\frac{5\pi}{6} = 150^\circ$$

$$150 = \text{ref } \angle 30$$

$$300^2$$



$$\textcircled{1} \frac{1}{2} (4 \cdot 20) (\sin 60)$$

$$40 \cdot \frac{\sqrt{3}}{2} = 20\sqrt{3}$$

$$\textcircled{2} \text{Ref } \angle = 60$$

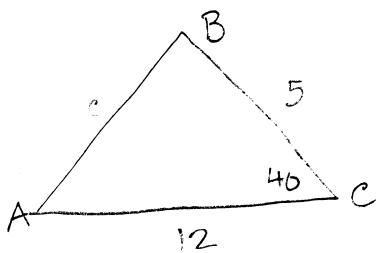
$$\frac{1}{2} (8 \cdot 8) (\sin 60)$$

$$32 (\sin 60)$$

$$32 \frac{\sqrt{3}}{2} = 16\sqrt{3}$$

$$36\sqrt{3} \text{ u}^2$$

11. In $\triangle ABC$, $a=5$, $b=12$, and $\angle C = 40^\circ$. Find c to two decimal places.



$$c^2 = 5^2 + 12^2 - 2(5 \cdot 12 \cos 40)$$

$$c^2 = 169 - 120 \cos 40$$

$$c^2 = 169 - 120(.766)$$

$$c^2 = 169 - 91.92$$

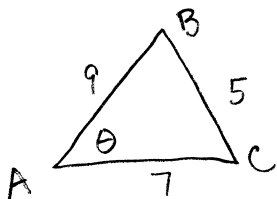
$$c^2 = 77.8$$

$$c = \sqrt{77.8}$$

$$c = 8.82$$

$$8.82$$

12. In $\triangle ABC$, $a=5$, $b=7$, and $c=9$. Find $\angle A$.



$$5^2 = 7^2 + 9^2 - 2(7 \cdot 9 \cdot \cos \theta)$$

$$25 = 49 + 81 - 126 \cos \theta$$

$$25 = 130 - 126 \cos \theta$$

$$-105 = -126 \cos \theta$$

$$-\frac{105}{126} = \cos \theta$$

$$\cos \theta = .8333$$

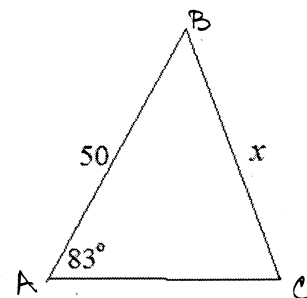
$$\theta = 33.56$$

$$\approx 34^\circ$$

13. Consider the mystery SSA triangle to the right.

(a) What is the smallest (approximate) value of x for which a triangle could be made?

$$\approx 49.9$$



(b) Complete the statement below with the most appropriate whole numbers.

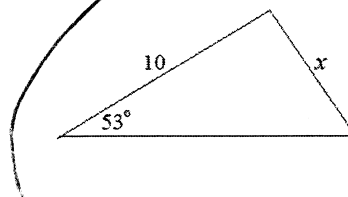
"This triangle will have two solutions (two possible sets of values) if ...

$$b \sin A < x < a < b$$

Don't worry about this. Just think!

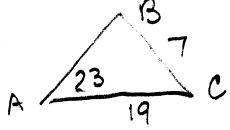
14. Consider another mystery SSA triangle to the right. You are guaranteed exactly one solution whenever...

$$x \geq 10$$



16. For each set of values given, find all possible values for angle B.

(a) $\angle A = 23^\circ$, $b = 19$, $a = 7$.



$$\frac{\sin 23}{7} = \frac{\sin \theta}{19}$$

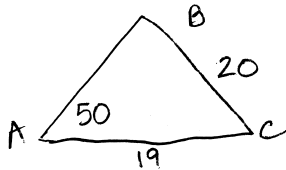
$$\sin \theta = \frac{\sin 23 (19)}{7}$$

$$\sin \theta = 1.06$$

but sin only goes from -1 to 1
so, value doesn't exist

~~Ø~~

(b) $\angle A = 50^\circ$, $b = 19$, $a = 20$



$$\frac{\sin 50}{20} = \frac{\sin B}{19}$$

$$\frac{\sin 50 (19)}{20} = \sin B$$

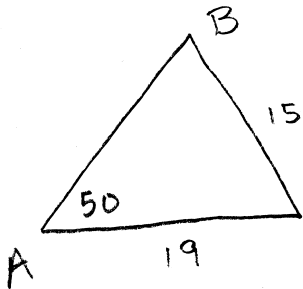
$$\frac{.766(19)}{20} = .7277 = \sin B$$

$$\angle B = 46.7^\circ \text{ AND } 133.3^\circ$$

but... $133.3 + 50 > 180^\circ$

$$\text{So } \angle B = 46.7^\circ$$

(c) $\angle A = 50^\circ$, $b = 19$, $a = 15$.



$$\frac{\sin 50}{15} = \frac{\sin B}{19}$$

$$\frac{\sin 50 (19)}{15} = \frac{14.554}{15} = .9703 = \sin B$$

$$\angle B = 76^\circ$$

$$180 - 76 = 104^\circ$$

Both of these angles
WORK

$$\angle B = 76 \text{ or } 104^\circ$$