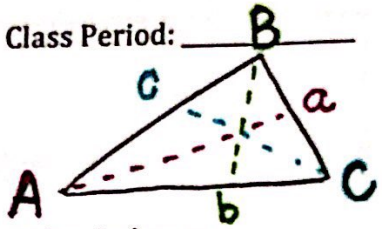
Name: _____ Class Period: _____



Precalculus – Unit 3 Day 1

Law of Sines

The law of sines can be used to solve a triangle if the following information is known:

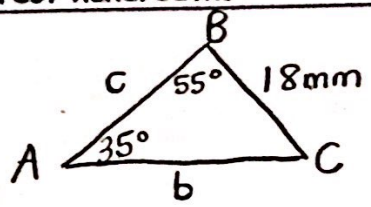
- Two angles and any side (AAS or ASA)
- Two sides and an angle opposite one of them (SSA).

biggest ∠ across from longest side

Solve the following triangles. Round answers to the nearest hundredth.

1. $A = 35°,\ B = 55°,\ a = 18\ mm$

$\angle C = 90°$



$\frac{\sin 35}{18} = \frac{\sin 55}{b}$

$b \sin 35 = 18 \sin 55$

$b = \frac{18 \sin 55}{\sin 35}$

$b = 25.71 mm$

$\frac{\sin 35}{18} = \frac{\sin 90}{c}$

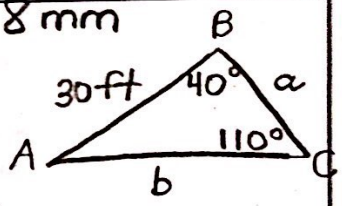
$c \sin 35 = 18 \sin 90$

$c = \frac{18 \sin 90}{\sin 35}$

$c = 31.38 mm$

2. $B = 40°,\ C = 110°,\ c = 30\ ft$

$\angle A = 30°$



$\frac{\sin 110}{30} = \frac{\sin 40}{b}$

$b \sin 110 = 30 \sin 40$

$b = \frac{30 \sin 40}{\sin 110}$

$b = 20.52 ft$

$\frac{\sin 110}{30} = \frac{\sin 30}{a}$

$a = \frac{30 \sin 30}{\sin 110}$

$a = 15.96 ft$

3. $A = 24.3°,\ C = 54.6°,\ c = 2.68,\ a = 1.35$

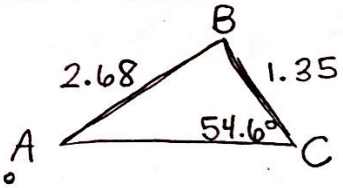
$\frac{\sin 54.6}{2.68} = \frac{\sin A}{1.35}$

$1.35 \sin 54.6 = 2.68 \sin A$

$\sin A = \frac{1.35 \sin 54.6}{2.68}$

$A = \sin^{-1}\left(\frac{1.35 \sin 54.6}{2.68}\right)$

$A = 24.24°$



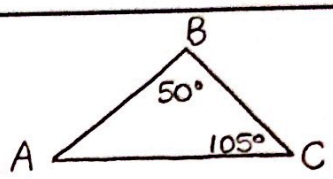
$\angle B = 101.16°$

$\frac{\sin 54.6}{2.68} = \frac{\sin 101.16}{b}$

$b = \frac{2.68 \sin 101.16}{\sin 54.6}$

$b = 3.23$

4. $B = 50°, C = 105°, c = 25$



$\angle A = 25°$

$$\frac{\sin 105}{25} = \frac{\sin 50}{b}$$

$$b = \frac{25 \sin 50}{\sin 105}$$

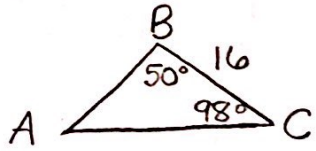
$b = 19.83$

$$\frac{\sin 105}{25} = \frac{\sin 25}{a}$$

$$a = \frac{25 \sin 25}{\sin 105}$$

$a = 10.94$

5. $B = 50°, C = 98°, a = 16$



$\angle A = 32°$

$$\frac{\sin 32}{16} = \frac{\sin 50}{b}$$

$$b = \frac{16 \sin 50}{\sin 32}$$

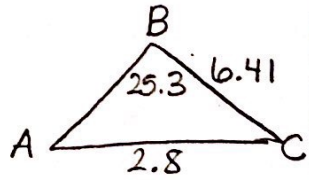
$b = 23.13$

$$\frac{\sin 32}{16} = \frac{\sin 98}{c}$$

$$c = \frac{16 \sin 98}{\sin 32}$$

$C = 29.90$

6. [redacted], $B = 25.3°$, $b = 2.8$, $a = 6.41$



$$\frac{\sin 25.3}{2.8} = \frac{\sin A}{6.41}$$

$$A = \sin^{-1}\left(\frac{6.41 \sin 25.3}{2.8}\right)$$

$\angle A = 78.05$

$\angle C = 76.65°$

$$\frac{\sin 25.3}{2.8} = \frac{\sin 76.65}{c}$$

$$c = \frac{2.8 \sin 76.65}{\sin 25.3}$$

$C = 6.37$