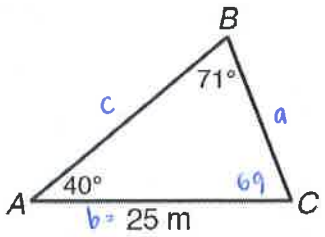
Pre-Calculus A
Law of Sines Homework

Name : Key
Date : _____ Period : _____

Use the Law of Sines to solve each triangle. Round lengths and angle measures to the nearest tenth.

1.



$\frac{\sin 40}{a} = \frac{\sin 71}{25} = \frac{\sin 69}{c}$

$a\sin 71 = 25\sin 40$

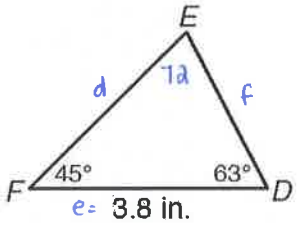
$a = 17\text{m}$

$c\sin 71 = 25\sin 69$

$c = 24.7$

$m\angle C = 69°$
$a = 17\text{m}$
$c = 24.7\text{m}$

2.



$\frac{\sin 45}{f} = \frac{\sin 72}{3.8} = \frac{\sin 63}{d}$

$f\sin 72 = 3.8\sin 45$

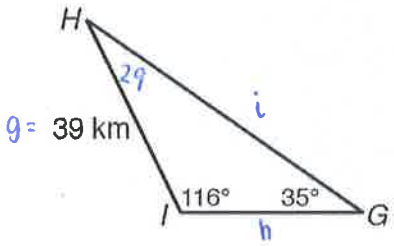
$f = 2.8$

$d\sin 72 = 3.8\sin 63$

$d = 3.6$

$m\angle E = 72°$
$f = 2.8\text{ in}$
$d = 3.6\text{ in}$

3.



$\frac{\sin 29}{h} = \frac{\sin 116}{i} = \frac{\sin 35}{39}$

$i\cdot\sin 35 = 39\sin 116$

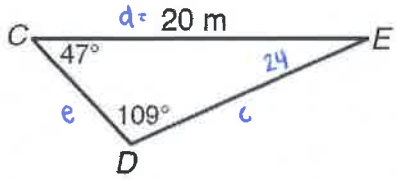
$i = 61.1\text{ km}$

$h\sin 35 = 39\cdot\sin 29$

$h = 33\text{ km}$

$m\angle H = 29°$
$i = 61.1\text{ km}$
$h = 33\text{ km}$

4.



$\frac{\sin 47}{c} = \frac{\sin 109}{20} = \frac{\sin 24}{e}$

$c\sin 109 = 20\sin 24$

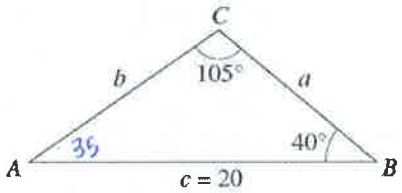
$e = 8.6$

$c\sin 109 = 20\sin 47$

$c = 15.5$

$m\angle E = 24°$
$e = 8.6\text{m}$
$c = 15.5\text{m}$

5.



$\frac{\sin 35}{a} = \frac{\sin 105}{20} = \frac{\sin 40}{b}$

$a\sin 105 = 20\sin 35$

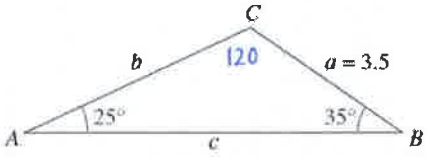
$a = 11.9$

$b\sin 105 = 20\sin 40$

$b = 13.3$

$m\angle A = 35°$
$a = 11.9$
$b = 13.3$

6.



$\frac{\sin 35}{b} = \frac{\sin 25}{3.5} = \frac{\sin 120}{c}$

$c\sin 25 = 3.5\sin 120$

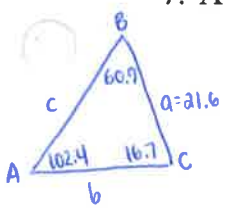
$c = 7.2$

$b\sin 25 = 3.5\sin 35$

$b = 4.8$

$m\angle C = 120°$
$c = 7.2$
$b = 4.8$

7. A = 102.4°, C = 16.7°, a = 21.6



$\frac{\sin 102.4}{21.6} = \frac{\sin 16.7}{c} = \frac{\sin 60.9}{b}$

$c \sin 102.4 = 21.6 \sin 16.7$

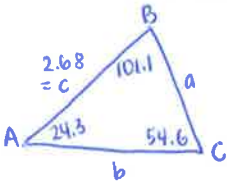
$c = 6.4$

$b \sin 102.4 = 21.6 \sin 60.9$

$b = 19.3$

$m\angle B = 60.9°$
$c = 6.4$
$b = 19.3$

8. A = 24.3°, C = 54.6°, c = 2.68



$\frac{\sin 24.3}{a} = \frac{\sin 101.1}{b} = \frac{\sin 54.6}{2.68}$

$a \sin 54.6 = 2.68 \sin 24.3$

$a = 1.4$

$b \sin 54.6 = 2.68 \sin 101.1$

$b = 3.2$

$m\angle B = 101.1°$
$a = 1.4$
$b = 3.2$

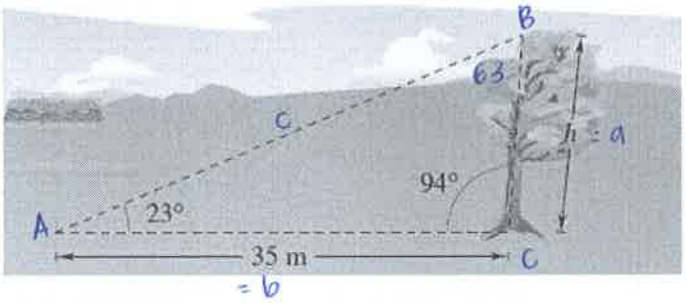
9. Because of prevailing winds, a tree grew so that it was leaning 4° from the vertical. At a point 35 meters from the tree, the angle of elevation to the top of the tree is 23° (see figure). Find the height h of the tree.

$\frac{\sin 23}{a} = \frac{\sin 63}{35}$

$a \sin 63 = 35 \sin 23$

$a = 15.3$

height = 15.3 m



10. The map shows three earthquake centers for one week in California. How far apart were the earthquake centers at points A and C? Round to the nearest tenth.

$\frac{\sin 39}{b} = \frac{\sin 60}{32}$

$b \sin 60 = 32 \sin 39$

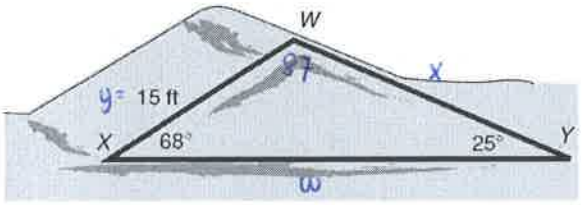
b = 23.3 mi away

11. A BMX track has a starting hill as shown in the diagram. What is the length of the hill, WY? Round to the nearest tenth.

$\frac{\sin 25}{15} = \frac{\sin 68}{x}$

$x \sin 25 = 15 \sin 68$

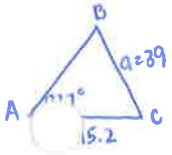
x = 32.9 ft long



Law of Sines – SSA Cases

Solve each triangle. Be sure to check for all solutions!

12. A = 93.7°, b = 15.2 ft, a = 39 ft



$\frac{\sin 93.7}{39} = \frac{\sin B}{15.2} = \frac{\sin C}{c}$

$39 \sin B = 15.2 \sin 93.7$

$\sin B = 0.3889$

$m\angle B = 22.9°$

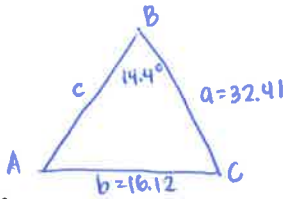
$m\angle C = 63.4°$

$c \sin 93.7 = 39 \sin 63.4$

$c = 34.9$

$m\angle B = 22.9°$
$m\angle C = 63.4°$
$c = 34.9$ ft

13. B = 14.4°, b = 16.12, a = 32.41



$\frac{\sin A}{32.41} = \frac{\sin 14.4}{16.12} = \frac{\sin C}{c}$

$16.12 \sin A = 32.41 \sin 14.4$

$\sin A = 0.5$

$m\angle A = 30°$

$m\angle C = 135.6°$

OR

$m\angle A = 150°$

$m\angle C = 15.6°$

$c \sin 14.4 = 16.12 \sin 135.6$

$c = 45.4$

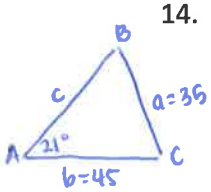
$c \sin 14.4 = 16.12 \sin 15.6$

$c = 17.4$

$m\angle A = 30°$
$m\angle C = 135.6°$
$c = 45.4$

$m\angle A = 150°$
$m\angle C = 15.6°$
$c = 17.4$

14. A = 21°, a = 35 km, b = 45 km



$\frac{\sin 21}{35} = \frac{\sin B}{45} = \frac{\sin C}{c}$

$35 \sin B = 45 \sin 21$

$\sin B = 0.4608$

$m\angle B = 27.4°$

$m\angle C = 131.6$

OR

$m\angle B = 152.6°$

$m\angle C = 6.4°$

$c \sin 21 = 35 \sin 131.6$

$c = 73$

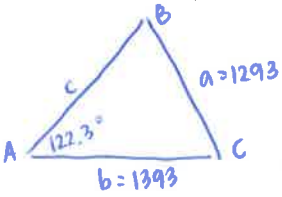
$c \sin 21 = 35 \sin 6.4$

$c = 10.9$

$m\angle B = 27.4°$
$m\angle C = 131.6°$
$c = 73$

$m\angle B = 152.6°$
$m\angle C = 6.4°$
$c = 10.9$

15. A = 122.3°, a = 1293 cm, b = 1393 cm



$\frac{\sin 122.3}{1293} = \frac{\sin B}{1393} = \frac{\sin C}{c}$

$1293 \sin B = 1393 \sin 122.3$

$\sin B = 0.9106$

$m\angle B = 65.6°$

$m\angle C = -7.9$ ← not possible to have a negative angle measure

no solution