Key

Math 4

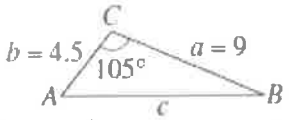
4-2 Practice

Name_____

Date_____

Use the Law of Sines or Cosines to find the missing side lengths and angle measures of the triangles shown or described below. Sides to hundredths + angles to whole #s.

1.



$c^2 = 4.5^2 + 9^2 - 2(4.5)(9)\cos 105$

$c^2 \approx 122.21$

$c \approx 11.06$

$\frac{\sin 105}{11.06} = \frac{\sin B}{4.5}$

$\sin B = \frac{4.5 \cdot \sin 105}{11.06}$

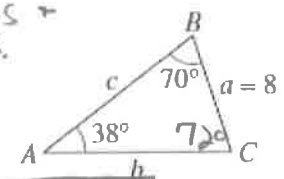
$\sin B \approx 0.393$

$\angle B \approx 23°$

$\angle A = 180 - 23 - 105$

$\angle A = 52°$

2.



$\angle C = 72°$

$\frac{c}{\sin 72°} = \frac{8}{\sin 38}$

$c = \frac{8 \cdot \sin 72}{\sin 38}$

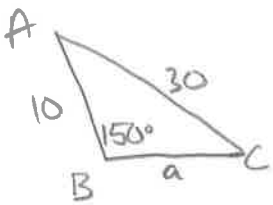
$c \approx 12.36$

$\frac{b}{\sin 70} = \frac{8}{\sin 38}$

$b = \frac{8 \cdot \sin 70}{\sin 38}$

$b \approx 12.21$

3. $B = 150°, b = 30, c = 10$



$\frac{\sin 150}{30} = \frac{\sin C}{10}$

$\sin C = \frac{10 \cdot \sin 150}{30}$

$\sin C \approx 0.16$

$C \approx 10°$

$\angle A = 20°$

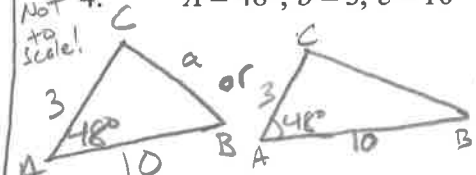
$\frac{a}{\sin 20} = \frac{30}{\sin 150}$

$a = \frac{30 \cdot \sin 20}{\sin 150}$

$a \approx 20.52$

4. $A = 48°, b = 3, c = 10$

Not to scale!



$a^2 = 3^2 + 10^2 - 2 \cdot 3 \cdot 10 \cdot \cos 48°$

$a^2 \approx 68.85$

$a \approx 8.3$

$\frac{\sin C}{10} = \frac{\sin 48}{8.3}$

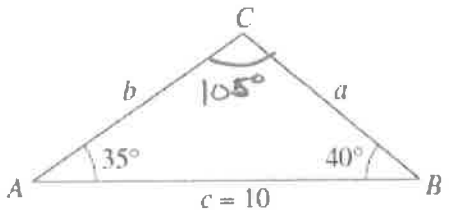
$\sin C = \frac{10 \cdot \sin 48}{8.3}$

$\sin C \approx 0.895$

$\angle C \approx 64°$ or $\angle C = 116°$

$\angle B = 68°$ or $\angle B = 16°$

5.



$\angle C = 105°$

$\frac{\sin 105}{10} = \frac{\sin 35}{a}$

$a = \frac{10 \cdot \sin 35}{\sin 105}$

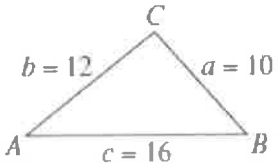
$a \approx 5.94$

$\frac{\sin 105}{10} = \frac{\sin 40}{b}$

$b = \frac{10 \cdot \sin 40}{\sin 105}$

$b \approx 6.65$

6.



$\cos A = \frac{12^2 + 16^2 - 10^2}{2 \cdot 12 \cdot 16}$

$\cos A = \frac{25}{32}$

$\angle A \approx 39°$

$\angle C = 92°$

$\frac{\sin 39}{10} = \frac{\sin B}{12}$

$\sin B = \frac{12 \cdot \sin 39}{10}$

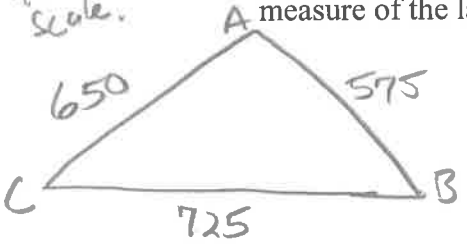
$\sin B \approx 0.755$

$\angle B \approx 49°$

Use the Law of Sines or Cosines to answer the questions below.

Not to scale.

7. A triangular parcel of ground has sides of lengths 725 feet, 650 feet, and 575 feet. Find the measure of the largest angle.

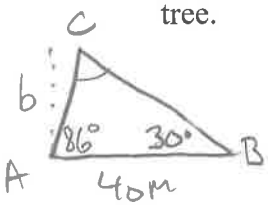


$\cos A = \frac{650^2 + 575^2 - 725^2}{2(650)(575)}$

$\cos A \approx \frac{7}{23}$

$\boxed{\angle A \approx 72^\circ}$

8. Because of prevailing winds, a tree grew so that it was leaning 4° from the vertical. At a point 40 meters from the tree, the angle of elevation to the top of the tree is 30°. Find the height of the tree.

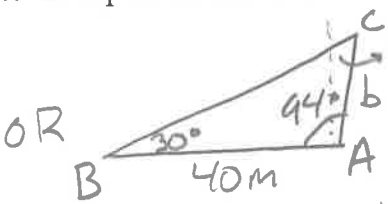


$\angle C = 64^\circ$

$\frac{\sin 64}{40} = \frac{\sin 30}{b}$

$b = \frac{40 \cdot \sin 30}{\sin 64} \approx \boxed{22.25\text{m}}$

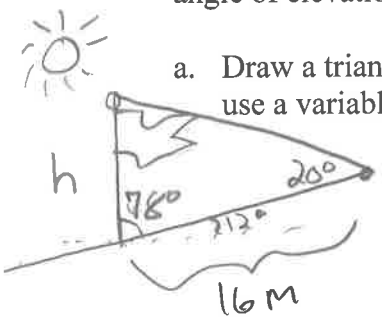
OR



$\frac{\sin 56}{40} = \frac{\sin 30}{b}$

$b = \frac{40 \cdot \sin 30}{\sin 56} \approx \boxed{24.12\text{m}}$

9. A flagpole at a right angle to the horizontal is located on a slope that makes an angle of 12° with the horizontal. The flagpole's shadow is 16 meters long and points directly up the slope. The angle of elevation from the tip of the shadow to the top of the pole is 20°.



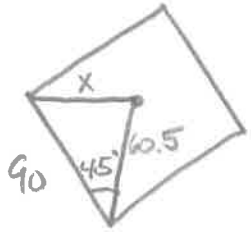
a. Draw a triangle to represent this situation. Show the known quantities on the triangle, and use a variable to indicate the height of the flagpole.

b. Find the height of the flagpole.

$\frac{h}{\sin 20} = \frac{16}{\sin 82}$

$h = \frac{16 \sin 20}{\sin 82} \approx \boxed{5.53\text{m}}$

10. On an MLB regulation baseball field, the pitcher's mound is 60.5 feet from home plate and there is a distance of 90 feet between bases (home to first, first to second, etc). How far is it from the pitcher's mound to third base?



$x^2 = 60.5^2 + 90^2 - 2(60.5)(90) \cdot \cos 45^\circ$

$x^2 \approx 4059.857$

$\boxed{x \approx 63.72\text{ ft}}$