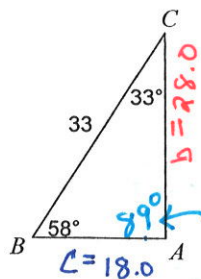


5.6 and 5.8 Practice Test (Laws of Sines and Cosines)

Solve each triangle. Clearly label the triangle with missing parts. Round your answers to the nearest tenth.

1)



Find c:

$$\frac{c}{\sin 33^\circ} = \frac{33}{\sin 89^\circ}$$

$$c = 33 \cdot \sin 33^\circ \div \sin 89^\circ$$

$$c = 17.98$$

$$180 - 33 - 58 = 89^\circ$$

USE LAW OF SINES

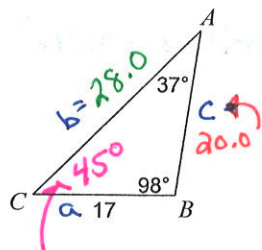
Find b

$$\frac{33}{\sin 89^\circ} = \frac{b}{\sin 58^\circ}$$

$$b = 33 \cdot \sin 58^\circ \div \sin 89^\circ$$

$$b = 27.98985$$

2)



Find b

$$\frac{17}{\sin 37^\circ} = \frac{b}{\sin 98^\circ}$$

$$b = 17 \cdot \sin 98^\circ \div \sin 37^\circ$$

$$b = 27.97$$

$$180 - 98 - 37$$

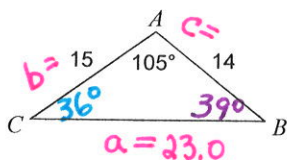
Find c

$$\frac{c}{\sin 45^\circ} = \frac{17}{\sin 37^\circ}$$

$$c = 17 \cdot \sin 45^\circ \div \sin 37^\circ$$

$$c = 19.97$$

3)



USE LAW OF COSINES

Find a:

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

$$a^2 = 15^2 + 14^2 - 2(15)(14) \cos 105^\circ$$

$$a^2 = 225 + 196 - 420 \cos 105^\circ$$

$$\sqrt{a^2} = \sqrt{529.704}$$

$$a = 23.015$$

Find B:

$$\frac{15}{\sin B} = \frac{23}{\sin 105^\circ}$$

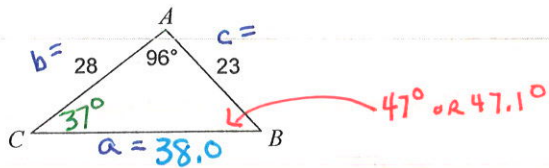
$$\sin B = 15 \cdot \sin 105^\circ \div 23$$

$$\sin B = .62995$$

$$B = \sin^{-1}(.62995) = 39.05^\circ$$

Find C: $C = 180 - 39 - 105$
 $C = 36^\circ$

4)



$$a^2 = 28^2 + 23^2 - 2(28)(23)\cos 96^\circ$$

$$a^2 = 1447.63$$

$$a = 38.04$$

FIND $\angle C$

$$\frac{38}{\sin 96^\circ} = \frac{23}{\sin C}$$

$$\sin C = 23 \cdot \sin 96^\circ \div 38$$

$$\sin C = .6019$$

$$C = \sin^{-1}(.6019) \quad (C = 37.00)$$

FIND $\angle B$

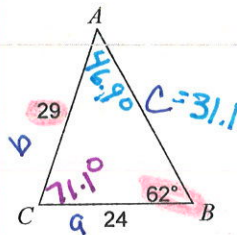
$$\frac{38}{\sin 96^\circ} = \frac{28}{\sin B}$$

$$\sin B = 28 \cdot \sin 96^\circ \div 38$$

$$\sin B = .7328$$

$$B = \sin^{-1}(.7328) \quad (B = 47.12)$$

5)



CAN USE LAW OF SINES BECAUSE WE HAVE AN ANGLE WITH ITS CORRESPONDING SIDE

$$\frac{29}{\sin 62^\circ} = \frac{24}{\sin A}$$

$$\sin A = 24 \cdot \sin 62^\circ \div 29$$

$$\sin A = .7307$$

$$A = \sin^{-1}(.7307) \quad (\angle A = 46.9^\circ)$$

$$\text{FIND } \angle C = 180 - 46.9 - 62$$

$$(\angle C = 71.1^\circ)$$

Find side c

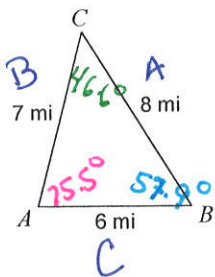
$$\frac{29}{\sin 62^\circ} = \frac{c}{\sin 71.1^\circ}$$

$$c = 29 \cdot \sin 71.1^\circ \div \sin 62^\circ$$

$$(c = 31.1)$$

6)

Remember units (miles)



$$\text{FIND } \angle A \quad 8^2 = 7^2 + 6^2 - 2(7)(6)\cos A$$

$$64 = 49 + 36 - 84\cos A$$

$$\frac{84\cos A}{84} = \frac{85-64}{84}$$

$$\cos A = .25$$

$$A = \cos^{-1}(.25)$$

$$(A = 75.5^\circ)$$

FIND $\angle B$

$$7^2 = 8^2 + 6^2 - 2(8)(6)\cos B$$

$$49 = 64 + 36 - 96\cos B$$

$$\frac{96\cos B}{96} = \frac{100-49}{96}$$

$$\cos B = .53125$$

$$B = \cos^{-1}(.53125)$$

$$(B = 57.9^\circ)$$

FIND $\angle C$

$$6^2 = 8^2 + 7^2 - 2(8)(7)\cos C$$

$$36 = 64 + 49 - 112\cos C$$

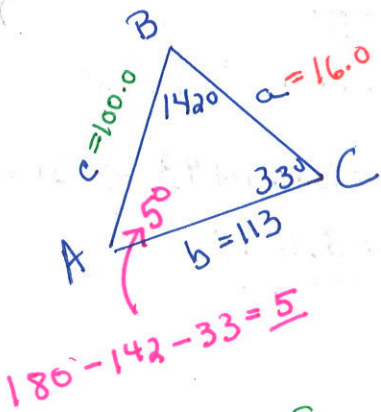
$$\frac{112\cos C}{112} = \frac{113-36}{112}$$

$$\cos C = .6875$$

$$C = \cos^{-1}(.6875) \quad (C = 46.6^\circ)$$

Sketch the triangle. Solve each triangle. Clearly label the triangle with missing parts. Round your answers to the nearest tenth.

7) $m\angle B = 142^\circ$, $m\angle C = 33^\circ$, $b = 113$



$$\frac{113}{\sin 142} = \frac{c}{\sin 33}$$

$$c = 113 \cdot \sin 33 \div \sin 142$$

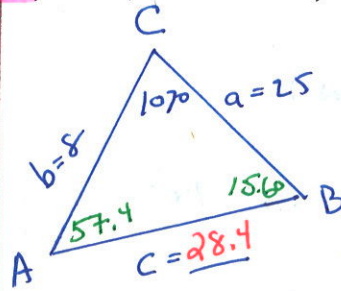
$$c = 99.96 \quad (c = 100.0)$$

$$\frac{113}{\sin 142} = \frac{a}{\sin 5^\circ}$$

$$a = 113 \sin 5^\circ \div \sin 142$$

$$a = 15.99 \quad (a = 16.0)$$

8) $b = 8$, $m\angle C = 107^\circ$, $a = 25$



$$c^2 = 25^2 + 8^2 - 2(25)(8) \cos 107^\circ$$

$$\sqrt{c^2} = \sqrt{805.94}$$

$$c = 28.4$$

$$\frac{28.4}{\sin 107^\circ} = \frac{8}{\sin B}$$

$$\sin B = \frac{8 \cdot \sin 107^\circ}{28.4}$$

$$\sin B = .2694$$

$$B = \sin^{-1}(.2694)$$

$$B = 15.6^\circ$$

$$\frac{28.4}{\sin 107^\circ} = \frac{25}{\sin A}$$

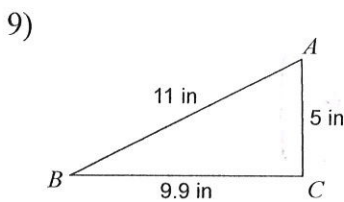
$$\sin A = \frac{25 \cdot \sin 107^\circ}{28.4}$$

$$\sin A = .8418$$

$$A = \sin^{-1}(.8418)$$

$$A = 57.33$$

Find the area of each triangle to the nearest tenth.



GIVEN 3 SIDES USE COSINE METHOD

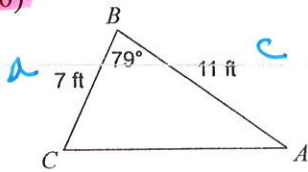
$$S = \frac{1}{2} (5 + 11 + 9.9) \quad \boxed{S = 12.95}$$

$$K = \sqrt{(12.95)(12.95 - 11)(12.95 - 9.9)(12.95 - 5)}$$

$$K = \sqrt{612.31}$$

$$\boxed{K = 24.7 \text{ sq in}}$$

10)

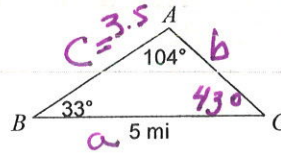


$$K = \frac{1}{2} a c \sin B$$

$$K = \frac{1}{2} (7)(11) \sin 79^\circ$$

$$K = 37.8 \text{ ft}^2$$

11)



To FIND AREA WITH SINE, YOU NEED TO FIND "C".

$$\frac{5}{\sin 104^\circ} = \frac{c}{\sin 43^\circ}$$

$$c = 5 \cdot \sin 43^\circ \div \sin 104^\circ$$

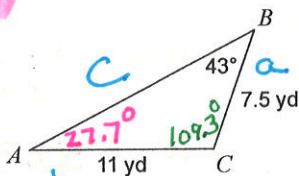
$$c = 3.514$$

$$K = \frac{1}{2} a c \sin B$$

$$K = \frac{1}{2} (5)(3.5) \sin 33^\circ = 4.77$$

$$K = 4.8 \text{ sq miles} \quad \text{or} \quad K = 4.8 \text{ mi}^2$$

12)



$$\frac{11}{\sin 43^\circ} = \frac{7.5}{\sin A}$$

$$\sin A = \frac{7.5 \cdot \sin 43^\circ}{11}$$

$$\sin A = .4649$$

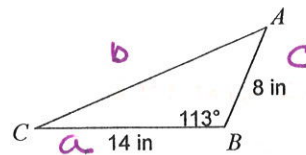
$$A = \sin^{-1}(.4649) \quad A = 27.7^\circ$$

$$K = \frac{1}{2} a b \sin C$$

$$K = \frac{1}{2} (7.5)(11) \sin 109.3^\circ$$

$$K = 38.9 \text{ yd}^2$$

13)



SINE METHOD

TO USE NEED 2 SIDES + included angle

$$K = \frac{1}{2} a c \sin B$$

$$K = \frac{1}{2} (14)(8) \sin 113$$

$$K = 51.5 \text{ in}^2$$