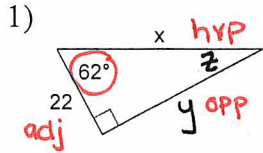


## STUDY GUIDE (PART I)

Find the missing side(s)/angle(s). Round to the nearest thousandth.



$$z = 180 - (90 + 62)$$

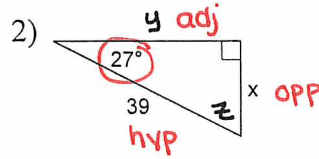
$$z = 28^\circ$$

$$\tan 62^\circ = \frac{y}{22}$$

$$y = 41.376$$

$$\cos 62^\circ = \frac{22}{x}$$

$$x = 46.861$$



$$z = 180 - (27 + 90)$$

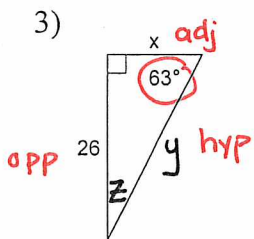
$$z = 63^\circ$$

$$\sin 27^\circ = \frac{x}{39}$$

$$x = 17.706$$

$$\cos 27^\circ = \frac{y}{39}$$

$$y = 34.749$$



$$z = 180 - (90 + 63)$$

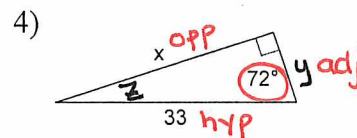
$$z = 27^\circ$$

$$\tan 63^\circ = \frac{26}{x}$$

$$x = 13.248$$

$$\sin 63^\circ = \frac{26}{y}$$

$$y = 29.180$$



$$z = 180 - (90 + 72)$$

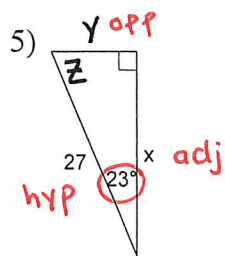
$$z = 18^\circ$$

$$\sin 72^\circ = \frac{x}{33}$$

$$x = 31.385$$

$$\cos 72^\circ = \frac{y}{33}$$

$$y = 10.198$$



$$z = 180 - (90 + 23)$$

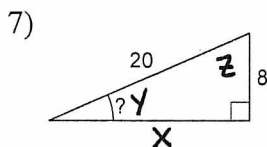
$$z = 67^\circ$$

$$\sin 23 = \frac{y}{27}$$

$$y = 10.550$$

$$\cos 23 = \frac{x}{27}$$

$$x = 24.854$$



$$x^2 + 8^2 = 20^2$$

$$x^2 = 336$$

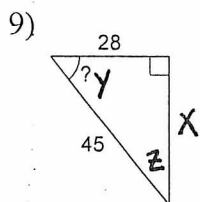
$$x = 18.330$$

$$\sin y = \frac{8}{20}$$

$$y = 23.578^\circ$$

$$\cos z = \frac{8}{20}$$

$$z = 66.422^\circ$$



$$28^2 + x^2 = 45^2$$

$$x^2 = 1241$$

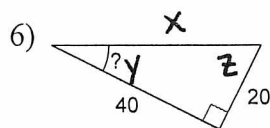
$$x = 35.228$$

$$\cos y = \frac{28}{45}$$

$$y = 51.521^\circ$$

$$\sin z = \frac{28}{45}$$

$$z = 38.479^\circ$$



$$40^2 + 20^2 = x^2$$

$$2000 = x^2$$

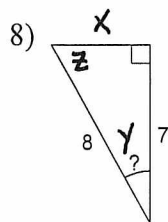
$$x = 44.721$$

$$\tan y = \frac{20}{40}$$

$$y = 26.565^\circ$$

$$\tan z = \frac{40}{20}$$

$$z = 63.435^\circ$$



$$x^2 + 7^2 = 8^2$$

$$x^2 = 15$$

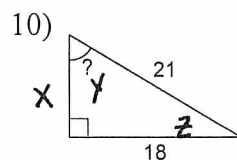
$$x = 3.873$$

$$\cos y = \frac{7}{8}$$

$$y = 28.955^\circ$$

$$\sin z = \frac{7}{8}$$

$$z = 61.045^\circ$$



$$x^2 + 18^2 = 21^2$$

$$x^2 = 117$$

$$x = 10.81$$

$$\sin y = \frac{18}{21}$$

$$y = 58.997^\circ$$

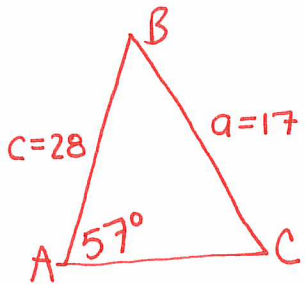
$$\cos z = \frac{18}{21}$$

$$z = 31.003^\circ$$

## STUDY GUIDE (PART I)

Solve each triangle. Round your answers to the nearest thousandth.

1)  $m\angle A = 57^\circ$ ,  $c = 28$  m,  $a = 17$  m (SSA)

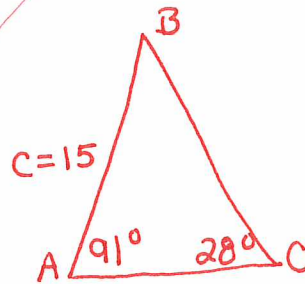
① find  $\angle C$ 

$$\frac{28}{\sin C} = \frac{17}{\sin 57^\circ}$$

 $\angle A \neq \text{error}$ 

Not a triangle

2)  $m\angle C = 28^\circ$ ,  $m\angle A = 91^\circ$ ,  $c = 15$  yd (AAS)

① find  $\angle B$ 

$$180 - (91 + 28)$$

$$\angle B = 61^\circ$$

$$\frac{a}{\sin 91^\circ} = \frac{b}{\sin 61^\circ} = \frac{15}{\sin 28^\circ}$$

②/③ find a &amp; b

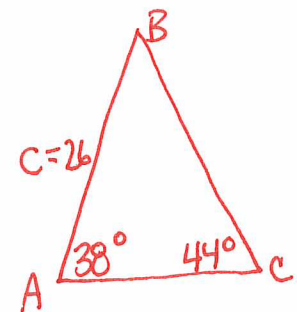
$$\frac{a}{\sin 91^\circ} = \frac{15}{\sin 28^\circ}$$

$$a = 31.946 \text{ yd}$$

$$\frac{b}{\sin 61^\circ} = \frac{15}{\sin 28^\circ}$$

$$b = 27.945 \text{ yd}$$

3)  $m\angle C = 44^\circ$ ,  $m\angle A = 38^\circ$ ,  $c = 26$  yd (AAS)

① find  $\angle B$ 

$$180 - (38 + 44)$$

$$\angle B = 98^\circ$$

$$\frac{a}{\sin 38^\circ} = \frac{b}{\sin 98^\circ} = \frac{26}{\sin 44^\circ}$$

②/③ find a &amp; b

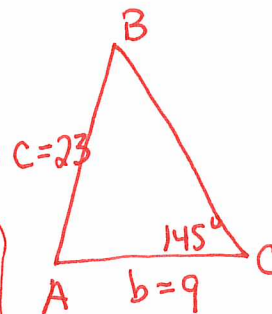
$$\frac{a}{\sin 38^\circ} = \frac{26}{\sin 44^\circ}$$

$$a = 23.643 \text{ yd}$$

$$\frac{b}{\sin 98^\circ} = \frac{26}{\sin 44^\circ}$$

$$b = 37.064 \text{ yd}$$

4)  $m\angle C = 145^\circ$ ,  $b = 9$  in,  $c = 23$  in (SSA)

① find  $\angle B$ 

$$\frac{9}{\sin B} = \frac{23}{\sin 145^\circ}$$

$$\angle B = 12.970^\circ$$

or

$$\angle B = 180 - 12.970^\circ$$

$$\angle B = 167.03^\circ$$

case 2  
doesn't work

② case 1

$$\angle B = 12.970^\circ$$

then find  $\angle A$ 

$$\angle A = 180 - (145 + 12.970)$$

$$\angle A = 22.03^\circ$$

find a

$$\frac{a}{\sin 22.03^\circ} = \frac{23}{\sin 145^\circ}$$

$$a = 15.041 \text{ in}$$

③ case 2

$$\angle B = 167.03^\circ$$

then find  $\angle A$ 

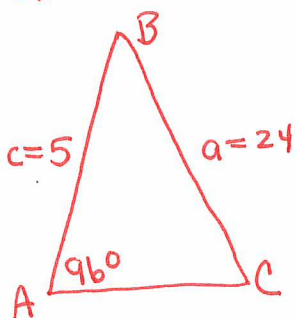
$$\angle A = 180 - (145 + 167.03)$$

$$\angle A = -132.03^\circ$$

(can't have neg. angle)

case 2 doesn't work!

5)  $m\angle A = 96^\circ$ ,  $a = 24$  km,  $c = 5$  km (SSA)



② case 1

$$\angle C = 11.958^\circ$$

then find  $\angle B$

$$\angle B = 180 - (11.958 + 96)$$

$$\angle B = 72.042^\circ$$

find  $b$

$$\frac{b}{\sin 72.042} = \frac{24}{\sin 96}$$

$$b = 22.957 \text{ km}$$

③ case 2

$$\text{or } \angle C = 180 - 11.958$$

$$\angle C = 168.042^\circ$$

$$\text{find } \angle B$$

$$180 - 168.042$$

$$\angle B = 11.958^\circ$$

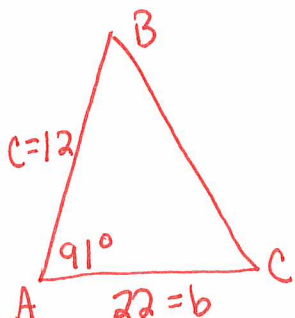
$$\angle B = 11.958^\circ$$

① find  $\angle C$

$$\frac{5}{\sin C} = \frac{24}{\sin 96}$$

$$\angle C = 11.958^\circ$$

7)  $c = 12$  in,  $b = 22$  in,  $m\angle A = 91^\circ$  (SAS)



② find  $\angle C$

$$\frac{12}{\sin C} = \frac{22}{\sin 91}$$

$$\angle C = 28.379^\circ$$

③ find  $\angle B$

$$180 - (91 + 28.379)$$

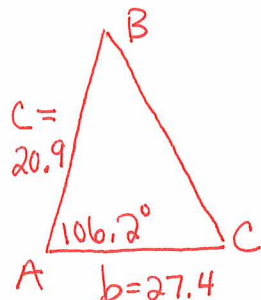
$$\angle B = 60.621^\circ$$

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

$$= 22^2 + 12^2 - 2(22)(12) \cos 91$$

$$a = 25.243 \text{ in}$$

9)  $m\angle A = 106.2^\circ$ ,  $b = 27.4$  in,  $c = 20.9$  in (SAS)



② find  $\angle C$

$$\frac{20.9}{\sin C} = \frac{27.4}{\sin 106.2}$$

$$\angle C = 31.131^\circ$$

③ find  $\angle B$

$$180 - (106.2 + 31.131)$$

$$\angle B = 42.669^\circ$$

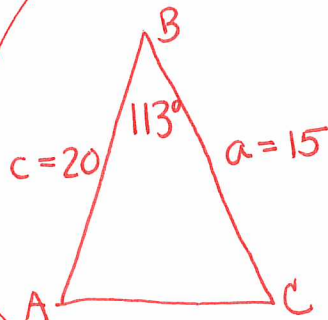
① find  $a$

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

$$= 27.4^2 + 20.9^2 - 2(27.4)(20.9) \cos 106.2$$

$$a = 38.821 \text{ in}$$

6)  $a = 15$  yd,  $m\angle B = 113^\circ$ ,  $c = 20$  yd (SAS)



② find  $\angle A$

$$\frac{15}{\sin A} = \frac{20}{\sin 113}$$

$$\angle A = 28.099^\circ$$

③ find  $\angle C$

$$180 - (113 + 28.099)$$

$$\angle C = 38.901^\circ$$

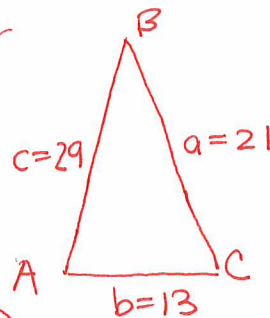
① find  $b$

$$b^2 = a^2 + c^2 - 2ac \cos B$$

$$= 15^2 + 20^2 - 2(15)(20) \cos 113$$

$$b = 29.316 \text{ yd}$$

8)  $c = 29$  km,  $b = 13$  km,  $a = 21$  km (SSS)



② find  $\angle A$

$$\frac{21}{\sin A} = \frac{13}{\sin 23.965}$$

$$\angle A = 41.006^\circ$$

③ find  $\angle C$

$$180 - (41.006 + 23.965)$$

$$\angle C = 115.029^\circ$$

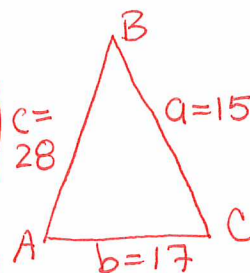
① find  $\angle B$

$$\cos B = \frac{a^2 + c^2 - b^2}{2ac}$$

$$\cos B = \frac{21^2 + 29^2 - 13^2}{2(21)(29)}$$

$$\angle B = 23.965^\circ$$

10)  $c = 28$  cm,  $a = 15$  cm,  $b = 17$  cm (SSS)



② find  $\angle B$

$$\frac{17}{\sin B} = \frac{15}{\sin 27.032}$$

$$\angle B = 31.003^\circ$$

③ find  $\angle C$

$$180 - (27.032 + 31.003)$$

$$\angle C = 121.965^\circ$$

① find  $\angle A$

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

$$= \frac{17^2 + 28^2 - 15^2}{2(17)(28)}$$

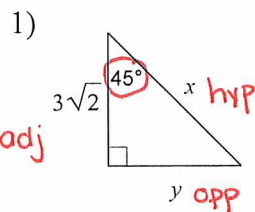
$$\angle A = 27.032^\circ$$

## STUDY GUIDE (PART II)

Date

Period

Find the missing side lengths. Leave your answers as radicals in simplest form.



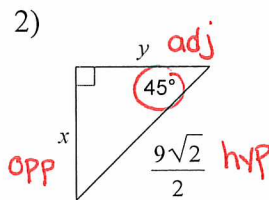
$$y = 3\sqrt{2}$$

$$x = 6$$

$$\cos 45^\circ = \frac{3\sqrt{2}}{x}$$

$$\frac{\sqrt{2}}{2} = \frac{3\sqrt{2}}{x} \Rightarrow \sqrt{2} x = 6\sqrt{2}$$

$$x = 6$$



$$\sin 45^\circ = \frac{x}{\frac{9\sqrt{2}}{2}}$$

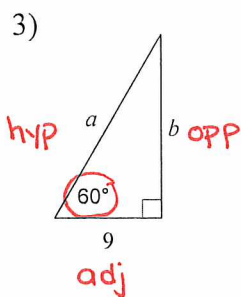
$$\frac{\sqrt{2}}{2} = \frac{x}{4.5\sqrt{2}} = 4.5\sqrt{4} = 2x$$

$$4.5 \cdot 2 = 2x$$

$$\frac{9}{2} = \frac{2x}{2} \quad x = \frac{9}{2}$$

$$x = \frac{9}{2}$$

$$y = \frac{9}{2}$$



$$b = 9\sqrt{3}$$

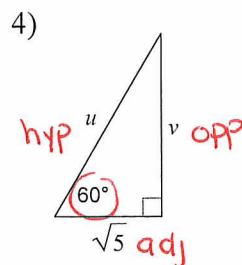
$$a = 18$$

$$\tan 60^\circ = \frac{b}{9}$$

$$\frac{\sqrt{3}}{1} = \frac{b}{9} \Rightarrow 9\sqrt{3} = b$$

$$\cos 60^\circ = \frac{9}{a}$$

$$\frac{1}{2} = \frac{9}{a} \Rightarrow a = 18$$



$$\tan 60^\circ = \frac{v}{\sqrt{5}}$$

$$\frac{\sqrt{3}}{1} = \frac{v}{\sqrt{5}}$$

$$v = \sqrt{15}$$

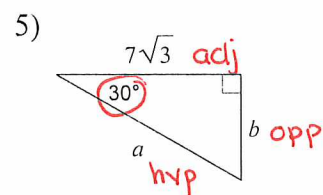
$$\cos 60^\circ = \frac{\sqrt{5}}{u}$$

$$\frac{1}{2} = \frac{\sqrt{5}}{u}$$

$$u = 2\sqrt{5}$$

$$v = \sqrt{15}$$

$$u = 2\sqrt{5}$$



$$b = 7$$

$$a = 14$$

$$\tan 30^\circ = \frac{b}{7\sqrt{3}}$$

$$\frac{\sqrt{3}}{3} = \frac{b}{7\sqrt{3}}$$

$$7\sqrt{9} = 3b \Rightarrow 7(3) = 3b$$

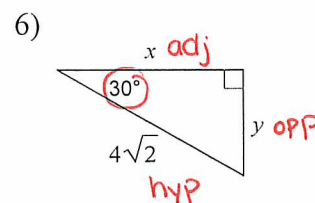
$$21 = 3b \rightarrow b = 7$$

$$\cos 30^\circ = \frac{7\sqrt{3}}{a}$$

$$\frac{\sqrt{3}}{2} = \frac{7\sqrt{3}}{a}$$

$$\sqrt{3} a = 14\sqrt{3}$$

$$a = 14$$



$$\sin 30^\circ = \frac{y}{4\sqrt{2}}$$

$$\frac{1}{2} = \frac{y}{4\sqrt{2}}$$

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

$$y = 2\sqrt{2}$$

$$\cos 30^\circ = \frac{x}{4\sqrt{2}}$$

$$\frac{\sqrt{3}}{2} = \frac{x}{4\sqrt{2}}$$

$$\frac{4\sqrt{6}}{2} = \frac{2x}{2} \quad x = 2\sqrt{6}$$

$$y = 2\sqrt{2}$$

$$x = 2\sqrt{6}$$