

# Right Triangle Trigonometry

Find the value of each. Round your answers to the nearest ten-thousandth.

1)  $\csc 23^\circ = \frac{1}{\sin(23^\circ)} = 2.56$

~~2)  $\tan \frac{5\pi}{36}$~~

$(3\sqrt{5})^2 = (3)^2 \cdot (\sqrt{5})^2$   
 $= 9 \cdot 5 = 45$

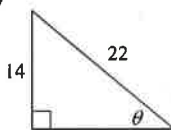
Find the value of the trig function indicated.

3)  $\csc \theta$

$x^2 + (3\sqrt{5})^2 = 9^2$   
 $x^2 + 45 = 81$   
 $x^2 = 36$   
 $x = 6$

$\frac{1}{\sin \theta}$   
 $\sin \theta = \frac{6}{9}$   
 $\csc \theta = \frac{9}{6} = \frac{3}{2}$

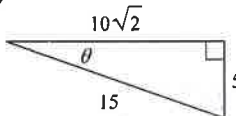
4)  $\tan \theta$



5)  $\tan \theta$

$\tan \theta = \frac{12}{9} = \frac{4}{3}$

6)  $\sec \theta$



~~7) Find  $\cot \theta$  if  $\cos \theta = \frac{3}{13}$~~

~~8) Find  $\cos \theta$  if  $\sin \theta = \frac{4\sqrt{13}}{17}$~~

~~9) Find  $\sec \theta$  if  $\cos \theta = \frac{\sqrt{2}}{10}$~~

~~10) Find  $\sin \theta$  if  $\sec \theta = \frac{5}{3}$~~

~~11) Find  $\tan \theta$  if  $\csc \theta = \sqrt{10}$~~

$\sin \theta = \frac{1}{\sqrt{10}} = \frac{\text{opp}}{\text{hyp}}$   
 $\tan \theta = \frac{1}{3}$

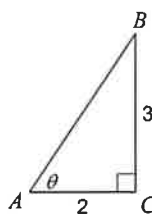
~~12) Find  $\cos \theta$  if  $\sec \theta = \frac{5}{4}$~~

Find the measure of each angle indicated. Round to the nearest tenth.

13)

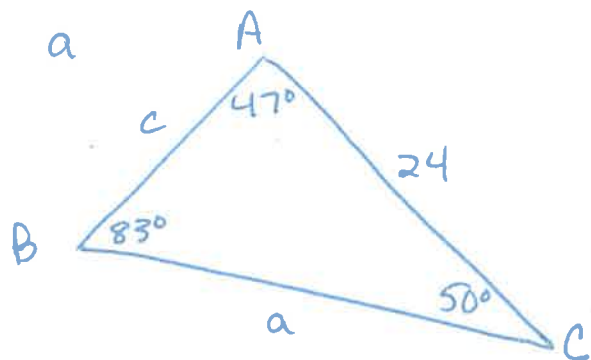
$\tan \theta = \frac{10}{13}$   
 $\theta = \tan^{-1}\left(\frac{10}{13}\right)$   
 $\theta \approx 37.6^\circ$

14)



H W Page 383 lab, #4

1. a



$$\frac{\sin 50}{c} = \frac{\sin 83}{24}$$

$$c \sin 83 = 24 \sin 50$$

$$c = \frac{24 \sin 50}{\sin 83}$$

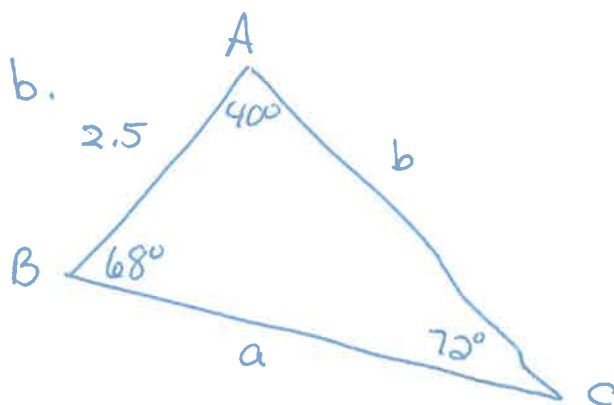
$$c \approx 18.5 \text{ cm}$$

$$\frac{\sin 47}{a} = \frac{\sin 83}{24}$$

$$a = \frac{24 \sin 47}{\sin 83}$$

$$a \approx 17.7 \text{ cm}$$

b.



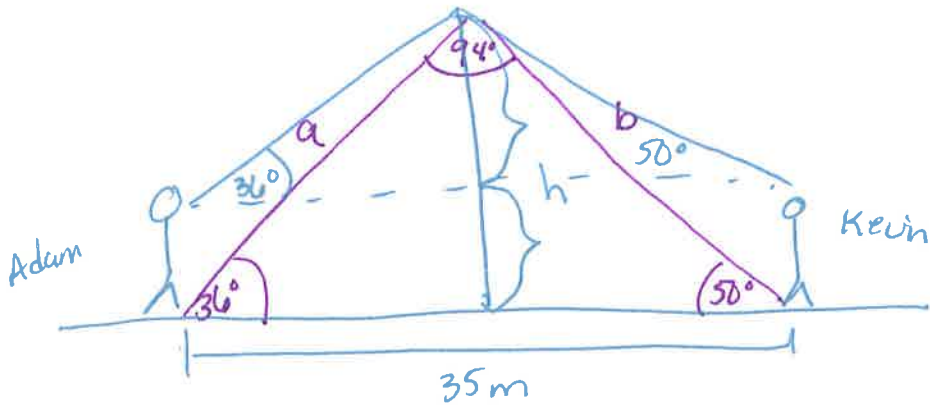
$$\frac{\sin 72}{2.5} = \frac{\sin 68}{b}$$

$$b \approx 2.44 \text{ cm}$$

$$\frac{\sin 72}{2.5} = \frac{\sin 40}{a}$$

$$a \approx 1.69 \text{ cm}$$

#4



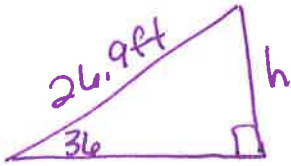
$$\frac{\sin 94}{35} = \frac{\sin 36}{b}$$

$$b \approx 20.62271974$$

$$\approx 20.6 \text{ m}$$

$$\frac{\sin 94}{35} = \frac{\sin 50}{a}$$

$$a \approx 26.9 \text{ m}$$

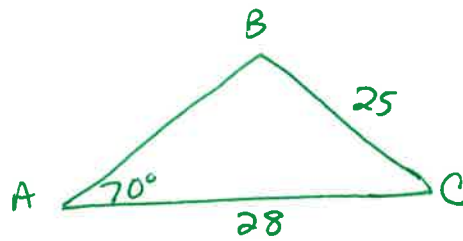


$$\sin 36 = \frac{h}{26.9}$$

$$h = 26.9 \sin 36$$

$$h \approx 15.8 \text{ m}$$

1e  $\hat{A} = 70^\circ, a = 25, b = 28$



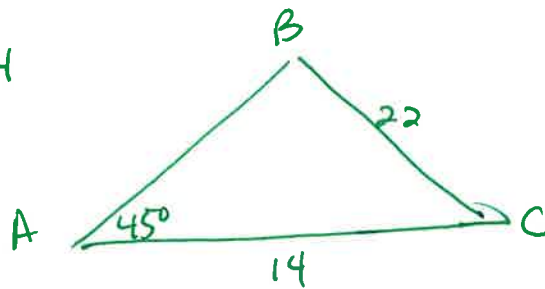
$$\frac{\sin B}{28} = \frac{\sin 70}{25}$$

$$B = \sin^{-1}\left(\frac{28 \sin 70}{25}\right)$$

$$B \approx \text{DNE} \quad \leftarrow 1.05 > 1$$

NO TRIANGLE

1g  $\hat{A} = 45^\circ, a = 22, b = 14$



$$\frac{\sin B}{14} = \frac{\sin 45}{22}$$

$$\hat{B} = \sin^{-1}\left(\frac{14 \sin 45}{22}\right)$$

$$\hat{B} \approx 26.74$$

$$\hat{C} = 180 - 45 - 26.7 = 108.3^\circ$$

$$\frac{\sin 45}{22} = \frac{\sin 108.3}{c}$$

$$\hat{C} = \frac{22 \sin 108.3}{\sin 45}$$

$$\hat{C} = 29.5 \text{ cm}$$

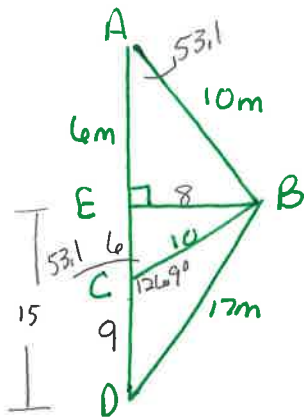
Triangle 1  
 $\hat{B} = 26.7^\circ$   
 $\hat{C} = 108.3^\circ$   
 $c = 29.5 \text{ cm}$

Check for 2nd  $\Delta$

$$C_2 = 180 - 29.5 = 150.5^\circ$$

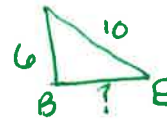
$$B_2 = 180 - 150.5 - 45 = -15.5^\circ \leftarrow \text{no neg } \angle\text{s}$$

2.



a)

find BE



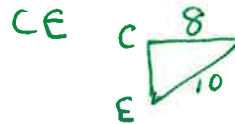
$$BE = 8m$$

$$BE^2 + 6^2 = 10^2$$

$$BE^2 = 100 - 36$$

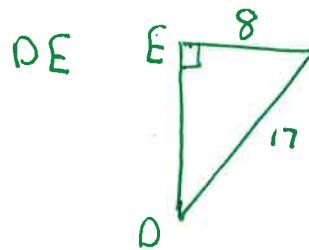
$$BE^2 = 64$$

$$BE = 8$$



$$EC = 6$$

$$CE = 6m$$



$$DE = 15m$$

$$DE^2 + 8^2 = 17^2$$

$$DE^2 = 289 - 64$$

$$DE^2 = 225$$

$$DE = 15$$

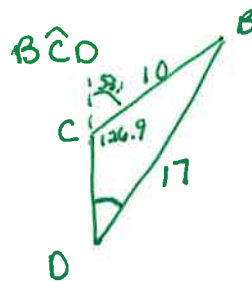


$$\sin A = \frac{8}{10}$$

$$\hat{A} = \sin^{-1}\left(\frac{8}{10}\right)$$

$$\hat{A} = 53.1^\circ$$

$\hat{BCE} \cong \hat{EAB}$   
(Isosceles)



$$180 - 53.1 = 126.9^\circ$$

(Linear pair)

$$\hat{EAB} = 53.1$$

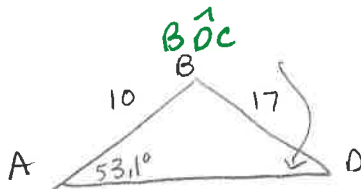
$$\hat{BCE} = 53.1$$

$$\hat{BCD} = 126.9^\circ$$

$$\hat{BCE} = 28.1^\circ$$

$$\hat{AED} = 98.8^\circ$$

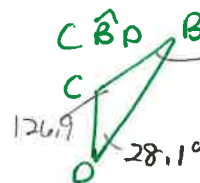
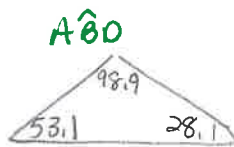
$$\hat{CDE} = 25.1^\circ$$



$$\frac{\sin D}{10} = \frac{\sin 53.1}{17}$$

$$D = \sin^{-1}\left(\frac{10 \sin 53.1}{17}\right)$$

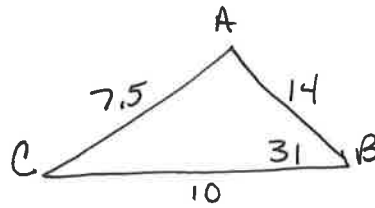
$$D \approx 28^\circ$$



$$180 - 126.9 - 28.1 = 25^\circ$$

HW 6 p. 389 1d, 2, 5

1d  $\hat{B} = 31^\circ, a = 10, c = 14$



$$b^2 = 10^2 + 14^2 - 2(10)(14)\cos(31)$$

$$b \approx 7.5 \text{ m}$$

$$b = 7.5 \text{ m}$$

$$\hat{A} \approx 43.4^\circ$$

$$\hat{B} \approx 105.6^\circ$$

$$\frac{\sin 31}{7.5} = \frac{\sin A}{10}$$

$$10 \sin 31 = 7.5 \sin A$$

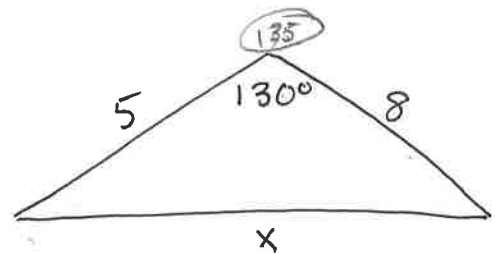
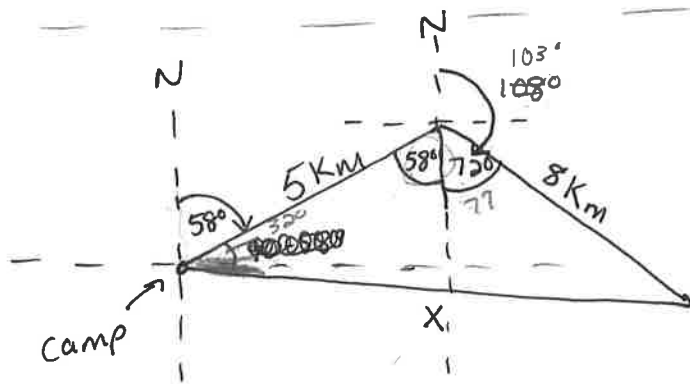
$$\sin A = \frac{10 \sin 31}{7.5}$$

$$A = \sin^{-1}\left(\frac{10 \sin 31}{7.5}\right)$$

$$A \approx 43.4^\circ$$

$$\therefore B \approx 180 - 31 - 43.4 = 105.6^\circ$$

2.



$\cos 135$

$$* X^2 = 5^2 + 8^2 - 2(5)(8)\cos 130$$

$$X \approx 11.85 \text{ or } 12 \text{ km}$$

Interesting  
Assumed



$$\frac{\sin 32}{8} = \frac{\sin 135}{x}$$

$$x \sin 32 = 8 \sin 135$$

$$x = \frac{8 \sin 135}{\sin 32}$$

$$x \approx 10.47$$

$$\frac{\sin 135}{x} = \frac{\sin 13}{5}$$

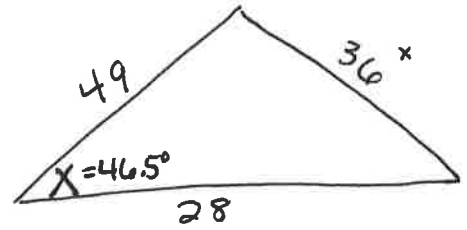
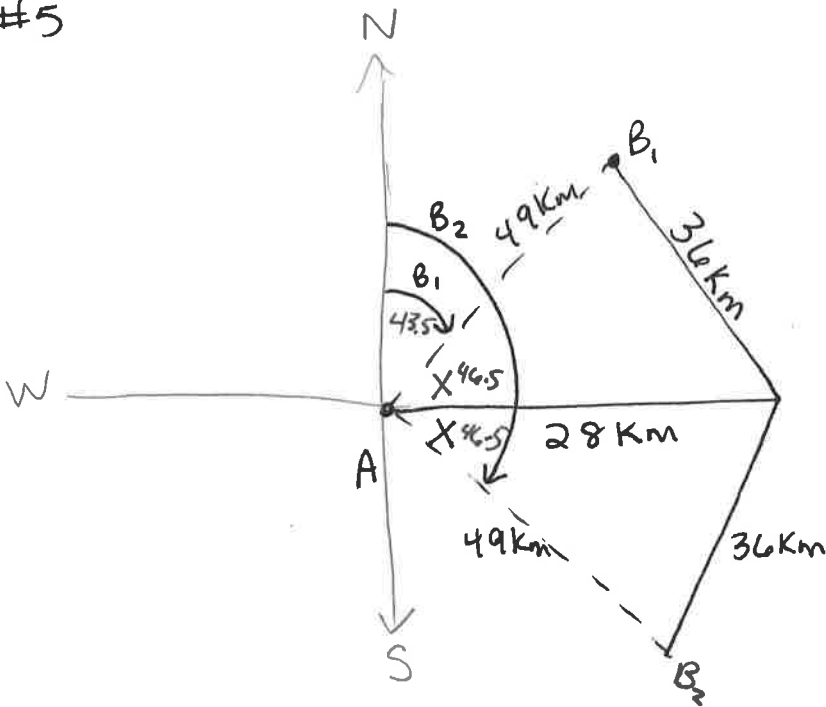
$$5 \sin 135 = x \sin 13$$

$$x = \frac{5 \sin 135}{\sin 13}$$

$$x \approx 12.85$$

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#5



$$\cos X = \frac{49^2 + 28^2 - 36^2}{2(49)(28)}$$

$$X = \cos^{-1}(.6884110787\dots)$$

$$X \approx 46.5$$

$$B_1 = 90 - 46.5 = 43.5^\circ$$

or

$$B_2 = 90 + 46.5 = 136.5^\circ$$