

SOLUTIONS

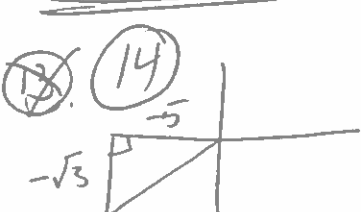
- I
 ① C
 ② C → ✗
 ③ C → ✗
 ④ C ✗
 ⑤ C ✗

- ⑥ D
 ⑦ A
 ⑧ B
 ⑨ D

⑩ B $\frac{472}{-360} \rightarrow \swarrow$
 112°

⑪ A → 
 $r = \sqrt{(3)^2 + (-5)^2} = \sqrt{34}$
 $\csc(\theta) = \frac{r}{y} = \frac{\sqrt{34}}{-5}$
 ⑫ omit

↑ SORRY. DIDN'T INTEND FOR THIS TO HAPPEN :



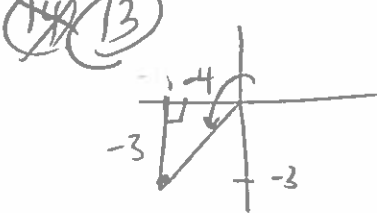
$$r = \sqrt{(-\sqrt{3})^2 + (-5)^2}$$

$$= \sqrt{3 + 25}$$

$$= \sqrt{28}$$
 so $x = -\sqrt{3}$
 $y = -5$
 $r = \sqrt{28}$

Thus

$\sin(\theta) = \frac{y}{r} = -\frac{\sqrt{3}}{\sqrt{28}}$	$\csc(\theta) = -\frac{\sqrt{28}}{\sqrt{3}}$
$\cos(\theta) = \frac{x}{r} = -\frac{5}{\sqrt{28}}$	$\sec(\theta) = -\frac{\sqrt{28}}{5}$
$\tan(\theta) = \frac{y}{x} = \frac{-\sqrt{3}}{-5} = \frac{\sqrt{3}}{5}$	$\cot(\theta) = \frac{5}{\sqrt{3}}$



$$r = \sqrt{(-4)^2 + (-3)^2}$$

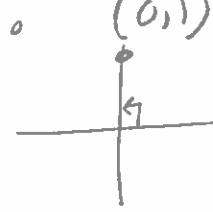
$$= \sqrt{16 + 9}$$

$$= \sqrt{25}$$

$$= 5$$
 so $x = -4$
 $y = -3$
 $r = 5$

Thus

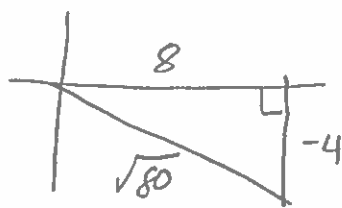
$\sin(\theta) = \frac{-3}{5}$	$\csc(\theta) = 5/-3$
$\cos(\theta) = \frac{-4}{5}$	$\sec(\theta) = -5/4$
$\tan(\theta) = \frac{3}{4}$	$\cot(\theta) = \frac{4}{3}$

⑮ $\theta = 450^\circ$
 $\frac{450}{-360}$
 90°

 $x = 0$
 $y = 1$
 $r = 1$

Thus

$\sin(\theta) = \frac{1}{1} = 1$	$\csc(\theta) = \frac{1}{1} = 1$
$\cos(\theta) = \frac{0}{1} = 0$	$\sec(\theta) = \frac{1}{0} = \text{undefined}$
$\tan(\theta) = \frac{y}{x} = \frac{1}{0} = \text{undefined}$	$\cot(\theta) = 0$

#16



$$r = \sqrt{(-4)^2 + (8)^2}$$

$$= \sqrt{16 + 64}$$

$$= \sqrt{80}$$

$$\text{so } x = 8$$

$$y = -4$$

$$r = \sqrt{80} \text{ thus}$$

$$\sin(\theta) = \frac{-4}{\sqrt{80}}$$

$$\csc(\theta) = \frac{\sqrt{80}}{-4}$$

$$\cos(\theta) = \frac{8}{\sqrt{80}}$$

$$\sec(\theta) = \frac{\sqrt{80}}{8}$$

$$\tan(\theta) = \frac{y}{x} = \frac{-4}{8}$$

$$\cot(\theta) = \frac{8}{-4}$$

#17



$$\sec(\theta) = \frac{r}{x} = -\frac{7}{5}$$

$$\text{so } r = 7$$

$$x = -5$$

$$\text{so } r^2 = x^2 + y^2$$

$$(7)^2 = (-5)^2 + y^2$$

$$49 = 25 + y^2$$

$$\Rightarrow 49 - 25 = y^2$$

$$\Rightarrow y^2 = 24$$

$$\Rightarrow y = \pm \sqrt{24}$$

$\Rightarrow$ choose positive

$$\Rightarrow y = \sqrt{24}$$

so we have

$$x = -5$$

$$y = \sqrt{24}$$

$$r = 7$$

so

$$\sin(\theta) = \frac{\sqrt{24}}{7}$$

$$\csc(\theta) = \frac{7}{\sqrt{24}}$$

$$\cos(\theta) = -\frac{5}{7}$$

$$\sec(\theta) = -\frac{7}{5}$$

$$\tan(\theta) = \frac{\sqrt{24}}{-5}$$

$$\cot(\theta) = -\frac{5}{\sqrt{24}}$$

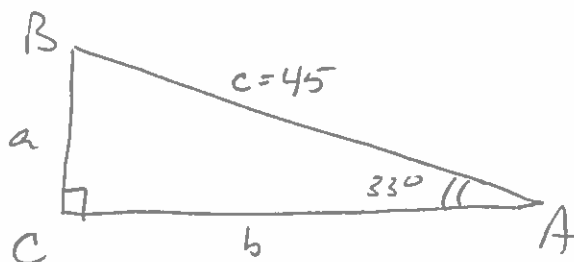
$$(19) \frac{\sec(\theta)}{\csc(\theta)} = \frac{\frac{r}{x}}{\frac{r}{y}}$$

$$= \frac{r}{x} \cdot \frac{y}{r}$$

$$= \frac{y}{x}$$

$$= \tan(\theta)$$

III (20) $A = 33^\circ$
 $C = 90^\circ$
 $c = 45$



MUST FIND

$$\angle B = 57^\circ$$

$$b = 37.7$$

$$a = 24.5$$

$\angle B:$ $B + 33^\circ = 90^\circ$
 $\Rightarrow B = 90 - 33^\circ$
 $= 57^\circ$

⑥ from $\angle A$ ~~is~~
 $b = \text{"adj"}$
 $c = \text{"hyp"}$
 use SOHCAHTOA

$$\cos(A) = \frac{\text{adj}}{\text{hyp}}$$

$\Rightarrow \cos(33^\circ) = \frac{b}{45}$
 cross-multiply $\Rightarrow$
 $\Rightarrow b = \frac{(45)(\cos(33^\circ))}{1}$
 $= 37.7$

② from $\angle A$

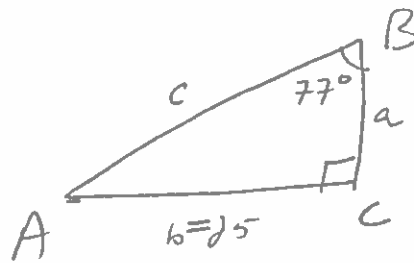
$a \rightarrow \text{opp}$

$c \Rightarrow \text{hyp}$

so $\sin(33^\circ) = \frac{a}{45}$

$\Rightarrow a = \frac{45 \cdot \sin(33^\circ)}{1}$
 $= 24.5$

(21) Given
 $\angle B = 77^\circ$
 $\angle C = 90^\circ$
 $b = 25$



MUST
FIND

↳

$$\begin{aligned} \angle A &= 13^\circ \\ a &= 5.8 \\ c &= 25.7 \end{aligned}$$

$\angle A:$
 $\angle A = 90 - 77$
 $= 13^\circ$

a: From $\angle B$
 b is opp } choose
 a is adj } $\tan(77^\circ)$

$$\frac{\tan(77^\circ)}{1} = \frac{25}{a}$$

$$\Rightarrow a \cdot \tan(77^\circ) = 25$$

$$\Rightarrow a = \frac{25}{\tan(77^\circ)}$$

$$= \boxed{5.8}$$

c: From $\angle B$

b is "opp" } choose
 c is "hyp" } $\sin(77^\circ)$

$$\frac{\sin(77^\circ)}{1} = \frac{25}{c}$$

$$\Rightarrow c \sin(77^\circ) = 25$$

$$\Rightarrow c = \frac{25}{\sin(77^\circ)}$$

$$= \boxed{25.7}$$

(V) $\sin(\theta) = -\frac{1}{2}$ $[0, 360^\circ)$

Quadrant check

Q III Q IV

Ref $\angle$: $\theta_r = 30^\circ$

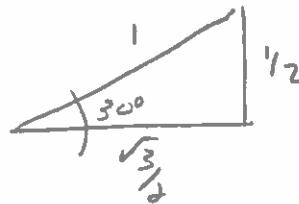
$\Rightarrow$ Q III ~~Q IV~~ Q III ~~Q IV~~

$$\theta = 180 + 30$$

$$= \boxed{210^\circ}$$

$$\theta = 360 - 30$$

$$= \boxed{330^\circ}$$

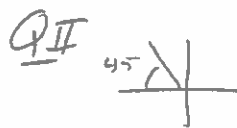
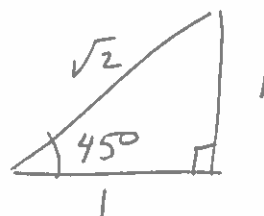


$$(23) \cos(\theta) = -\frac{1}{\sqrt{2}} \quad [0, 360^\circ)$$

Quad. check

QII, QIII

$$\text{Ref } x \Rightarrow \theta_r = 45^\circ$$



$$\theta = 180 - 45 = \boxed{135^\circ}$$

QIII



$$\theta = 180 + 45 = \boxed{225^\circ}$$

NOTE! SPECIAL!

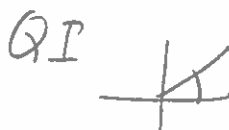
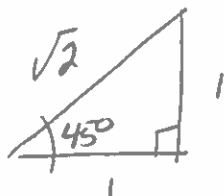
$$(24) \tan(\theta) = 1$$

NOT QUADRANTAL!

Quad check

QI QIII

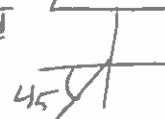
$$\text{Ref } x \Rightarrow \theta_r = 45^\circ$$



$$\theta = \boxed{45^\circ}$$

NOTE: BE SURE to include the degree symbol!

QIII



$$\theta = 180 + 45 = \boxed{225^\circ}$$

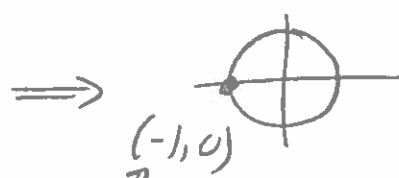
$$(25) \sec(\theta) = -1$$

$$\Rightarrow \cos(\theta) = \frac{1}{-1}$$

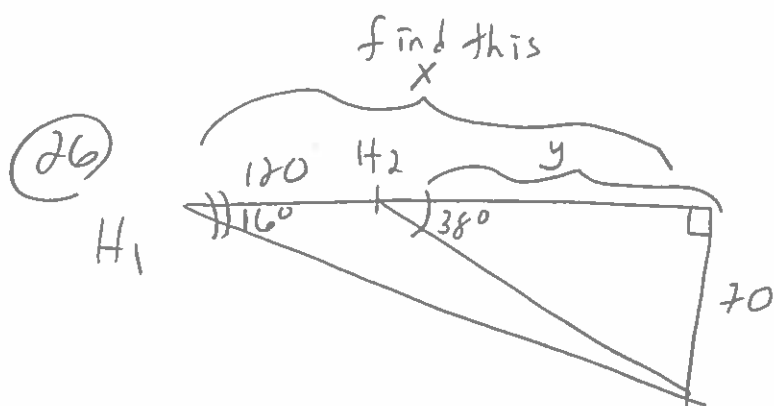
$$\Rightarrow \cos(\theta) = -1$$

$$\hookrightarrow x\text{-coord} = -1$$

FORM RECIPROCAL OF BOTH SIDES



$$\Rightarrow \boxed{\theta = 180^\circ}$$



We know in the small triangle

$$\tan(38^\circ) = \frac{70}{y}$$

$$\Rightarrow y \tan(38^\circ) = 70$$

$$\Rightarrow y = \frac{70}{\tan(38^\circ)}$$

$$= 89.6$$

$$\text{So } X = 120 + 89.6$$

$$= 209.6$$

VII

