Solutions Exam I

SOLUTIONS EXAM I

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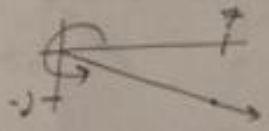
I

1. B
2. B $-230° + 360° = 130°$
3. A
4. A $-290° + 360° = 70°$
5. D signum of $\cot(\theta)$ is NEGATIVE $\Rightarrow$ QII or QIII so the signum of $\sec(\theta)$ is not determined
6. D 
7. B $\tan(\theta) < 0 \Rightarrow$ QII or QIII
   $\sec(\theta) < 0 \Rightarrow$ QII or QIII
   $\Rightarrow$ QII
8. D $\tan(\theta) < 0 \Rightarrow$ QII or QIII
   $\sec(\theta) > 0 \Rightarrow$ QI or QIII
   $\Rightarrow$ QIII
9. D 
10. A $-275° + 360° = 85°$
11. B $\sin(\theta) > 0 \Rightarrow$ QI or QII
    $\sec(\theta) < 0 \Rightarrow$ QII or QIII
    $\Rightarrow$ QII
12. B $\csc(\theta) \neq \frac{r}{y}$ so NOT A; $\sin(\theta) \neq \frac{r}{x}$ so NOT C;
    $\tan(\theta) \neq \frac{x}{y}$ so NOT D $\Rightarrow$ $\csc(\theta) = \frac{r}{y}$, $\tan(\theta) = \frac{y}{x}$ $\Rightarrow$ B

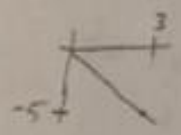
(13.) D signum of $\tan(\theta)$ positive $\Rightarrow$ QI or QIII
so signum of $\sec(\theta)$ is NOT DETERMINED

(14.) B $\tan(\theta) \neq \frac{x}{y}$ so NOT A; $\sec(\theta) \neq \frac{r}{y}$ so NOT C
$\sin(\theta) \neq \frac{r}{x}$ so NOT D; $\sec(\theta) = \frac{r}{x}$, $\tan(\theta) = \frac{y}{x}$ $\Rightarrow$ so B

(15.) $\cos(\theta) \neq \frac{r}{x}$ so NOT A; $\sin(\theta) \neq \frac{r}{y}$ so NOT B
$\sin(\theta) \neq \frac{r}{x}$ so NOT C; $\sin(\theta) = \frac{y}{r}$, $\cot(\theta) = \frac{x}{y}$ $\Rightarrow$ so D

(16.) D signum of $\tan(\theta)$ is negative $\Rightarrow$ QII or QIIII
so signum of $\sec(\theta)$ is not determined

(17.) B $472^\circ - 360^\circ = 112^\circ \Rightarrow$ QII

(18.) A 

$\Rightarrow x = 3$, $y = -5$
$r = \sqrt{(3)^2 + (-5)^2}$
$= \sqrt{34}$
so $\csc(\theta) = \frac{r}{y}$
$= \boxed{\frac{\sqrt{34}}{-5}}$

(19.) A $\cos(\theta) = \frac{1}{4} = \frac{x}{r}$
$x = 1$, $r = 4$ $\Rightarrow y = \sqrt{(4)^2 - (1)^2}$
$= \sqrt{15}$
so $\tan(\theta) = \frac{y}{x}$
$= \frac{\sqrt{15}}{1} = \boxed{\sqrt{15}}$

(20.) A $\sec(\theta) \neq \frac{r}{y}$ so NOT B; $\sin(\theta) \neq \frac{r}{x}$ so NOT C
$\tan(\theta) \neq \frac{r}{y}$ so NOT D; $\sec(\theta) = \frac{r}{x}$, $\tan(\theta) = \frac{y}{x}$ $\Rightarrow$ so A

(21). B signum of $\tan(\theta)$ and signum of $\cot(\theta)$ always agree — By Theorem

(22). C $575° - 360° = 215° \Rightarrow$ QIII

(23). A $5x+y=0 \Rightarrow y=-5x \Rightarrow$  $\Rightarrow$ SO FAR WE HAVE QII or QIIII

WE ALSO HAVE $x>0 \Rightarrow$ QIIII

CHOOSE A POINT ON THE LINE IN QIIII $\Rightarrow$ say, $(1,-5)$

$\Rightarrow x=1$, $y=-5 \Rightarrow r=\sqrt{(1)^2+(-5)^2}=\sqrt{26}$ $\Rightarrow$ SO $\csc(\theta)=\frac{r}{y}=\boxed{\frac{\sqrt{26}}{-5}}$

(24). E $\tan(\theta)=-\frac{\sqrt{11}}{4}=\frac{y}{x}$ in QIIII $\Rightarrow x>0$, $y<0 \Rightarrow x=4$, $y=-\sqrt{11}$

SO $r=\sqrt{(4)^2+(-\sqrt{11})^2}=\sqrt{16+11}=\sqrt{27}$ $\Rightarrow$ SO $\cos(\theta)=\frac{x}{r}=\frac{4}{\sqrt{27}}$ NONE OF THESE

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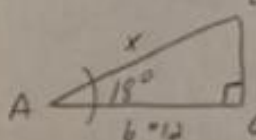
(25) $(-5,-12) \Rightarrow x=-5$, $y=-12 \Rightarrow r=\sqrt{(-5)^2+(-12)^2}=\sqrt{169}=13$

SO $\sin(\theta)=\frac{y}{r}=\boxed{-\frac{12}{13}}$ $\cos(\theta)=\frac{x}{r}=\boxed{-\frac{12}{13}}$ $\tan(\theta)=\frac{y}{x}=\frac{-12}{-5}=\boxed{\frac{12}{5}}$

(26). 

$\Rightarrow \cos(18°)=\frac{\text{ADJ}}{\text{HYP}}$ $\Rightarrow \cos(18°)=\frac{12}{x}$ $\Rightarrow x=\frac{12}{\cos(18°)}=12.617\ldots$ $\Rightarrow \boxed{x \approx 13}$

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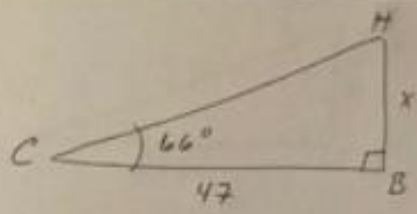
(27.)



$\tan(\theta) = \frac{opp}{adj}$

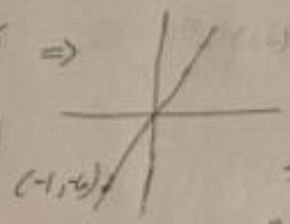
$\Rightarrow \tan(66°) = \frac{x}{47}$

$\Rightarrow x = 47\tan(66°) = 105.563...$

$\Rightarrow \boxed{x \approx 106}$

(28.)

$6x - y = 0 \Rightarrow y = 6x$ and $x \le 0$ so we may use $(-1, -6)$



so $x = -1$, $y = -6$

$\Rightarrow r = \sqrt{(-1)^2 + (-6)^2} = \sqrt{37}$

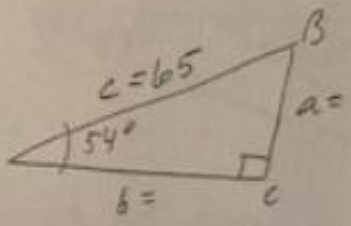
SO

$\cot(\theta) = \frac{x}{y} = \frac{-1}{-6} = \boxed{\frac{1}{6}}$

$\sec(\theta) = \frac{r}{x} = \frac{\sqrt{37}}{-1} = \boxed{-\sqrt{37}}$

$\csc(\theta) = \frac{r}{y} = \frac{\sqrt{37}}{-6} = \boxed{\frac{\sqrt{37}}{6}}$

(29.)



FIND

$\angle B = 36°$

$a \approx 52.59°$

$b \approx 38.21°$

$\angle B$: $B = 90° - 54° = 36°$

a: $\sin(54°) = \frac{a}{65}$

$\Rightarrow a = 65 \cdot \sin(54°)$

$= 52.586...$

$\approx 52.59°$

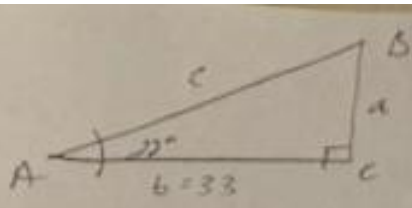
b: $\cos(54°) = \frac{b}{65}$

$\Rightarrow b = 65\cos(54°)$

$= 38.206...$

≈ 38.21

(30)



Pg 5.1c

FIND: $\angle B = 68°$, $a \approx 13.33$, $c \approx 35.59$

$\angle B$: $B = 90° - 22° = 68°$

a: $\tan(22°) = \frac{a}{33}$

$\Rightarrow a = 33\tan(22°)$

$= 13.332...$

≈ 13.33

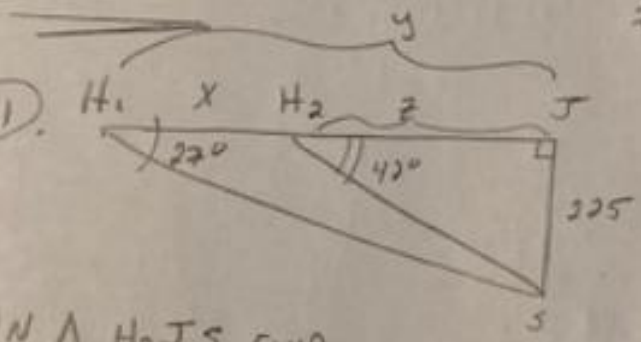
c: $\cos(22°) = \frac{33}{c}$

$\Rightarrow c = \frac{33}{\cos(22°)}$

$= 35.591...$

≈ 35.59

(31)



Let $x = H_1H_2$

$y = H_1J$

$z = H_2J$

FIND: $x =$

(A) IN ΔH_2JS FIND Length z:

$\tan(42°) = \frac{225}{z}$

$\Rightarrow z = \frac{225}{\tan(42°)}$

$= 249.887...$

(B) IN ΔH_1JS FIND length y:

$\tan(27°) = \frac{225}{y}$

$\Rightarrow y = \frac{225}{\tan(27°)}$

$= 441.587...$

(C) FINALLY $x = y - z = 191.699...$

$\approx \boxed{191.7}$