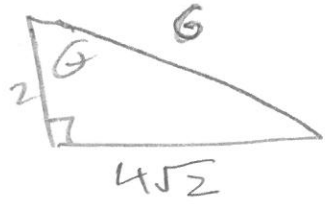
WORKED OUT SOLUTIONS TO TRIG QUARTER EXAM REVIEW

① 

$\sqrt{6^2-2^2} = \text{leg} = \sqrt{36-4} = \sqrt{32}$
$= 4\sqrt{2}$

$\sin\theta = \frac{4\sqrt{2}}{6} = \frac{2\sqrt{2}}{3}$ $\quad \csc\theta = \frac{3}{2\sqrt{2}} = \frac{3\sqrt{2}}{4}$

$\cos\theta = \frac{2}{6} = \frac{1}{3}$ $\quad \sec\theta = \frac{3}{1}$

$\tan\theta = \frac{4\sqrt{2}}{2} = 2\sqrt{2}$ $\quad \cot\theta = \frac{1}{2\sqrt{2}} = \frac{\sqrt{2}}{4}$

② $\cos\theta = \frac{5}{7}$ θ in QIV

$\text{leg} = \sqrt{7^2-5^2} = \sqrt{49-25} = \sqrt{24}$
$= 2\sqrt{6}$

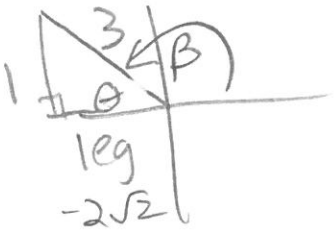
why $-2\sqrt{6}$? QIV & Sine

$\sin\theta = \frac{-2\sqrt{6}}{7}$ $\quad \csc\theta = \frac{-7}{2\sqrt{6}} = \frac{7\sqrt{6}}{12}$

$\cos\theta = \frac{5}{7}$ $\quad \sec\theta = \frac{7}{5}$

$\tan\theta = \frac{-2\sqrt{6}}{5}$ $\quad \cot\theta = \frac{-5}{2\sqrt{6}} = \frac{-5\sqrt{6}}{12}$

(3) $\csc\beta = \frac{3}{1}$ β in QII



$leg = \sqrt{3^2-1^2} = \sqrt{9-1} = \sqrt{8} = 2\sqrt{2}$

$= -2\sqrt{2}$ why $-2\sqrt{2}$ cosine in II

$$\tan\beta = \frac{1}{-2\sqrt{2}} = \frac{-\sqrt{2}}{4}$$

(4) complement of $\frac{\pi}{7}$

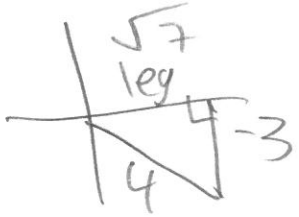
$$\frac{\pi}{2} - \frac{\pi}{7} = \frac{7\pi}{14} - \frac{2\pi}{14} = \frac{5\pi}{14}$$

supplement of $\frac{\pi}{7}$

$$\pi - \frac{\pi}{7} = \frac{7\pi}{7} - \frac{1\pi}{7} = \frac{6\pi}{7}$$

(5) $\sin\theta = \frac{-3}{4}$ Q III / Q IV but $\cos\theta > 0$ Q I / Q IV

so θ in QIV



$leg = \sqrt{4^2-3^2}$

$= \sqrt{16-9}$

$= \sqrt{7}$

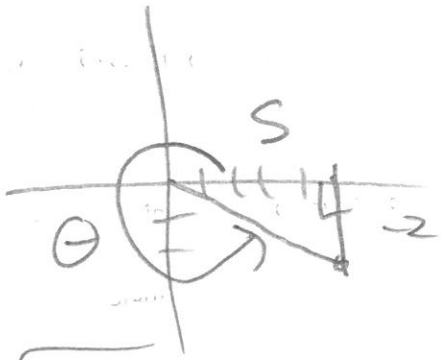
why $+\sqrt{7}$ ($\cos$ in I & IV)

$\sec\theta = \frac{hyp}{adj} = \frac{4}{\sqrt{7}}$

$$\sec\theta = \frac{4\sqrt{7}}{7}$$

$$\cot\theta = \frac{adj}{opp} = \frac{-\sqrt{7}}{3}$$

(6) $(5, -2)$



$hyp = \sqrt{5^2 + 2^2} = \sqrt{25+4}$

$\boxed{hyp = \sqrt{29}}$

$\csc\theta = \frac{hyp}{opp} = \frac{\sqrt{29}}{-2}$

$\boxed{\csc\theta = -\frac{\sqrt{29}}{2}}$

(7) $\tan\theta = 0$ $\begin{matrix} 0 \\ 180 \\ 360 \end{matrix}$ $\cos\theta = -1$ / 180

$\sin\theta$ is $\sin 180 = 0$

$\cot\theta$ $\cot 180 =$ und

(8) LS of

rotating 75 times/hr

$\theta = 75 \cdot 2\pi$

$= 150\pi$

$r = \frac{18}{2} = 9$

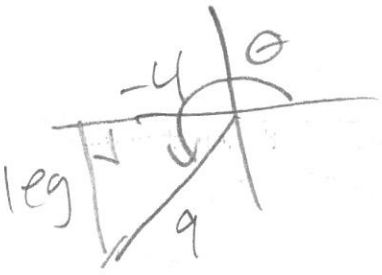
$LS = \frac{\theta r}{t}$

$= \frac{(150\pi)(9)\text{ in}}{1\text{ hr}}$

$= \boxed{\frac{1350\pi\text{ in}}{1\text{ hr}}}$

⑨ $\sec\theta = -\frac{9}{4}$ < Q II / Q III

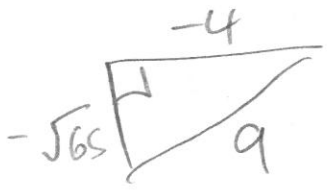
$\csc\theta < 0$ < Q III / Q IV



$leg = \sqrt{9^2 - 4^2} = \sqrt{81-16}$

$= \sqrt{65}$

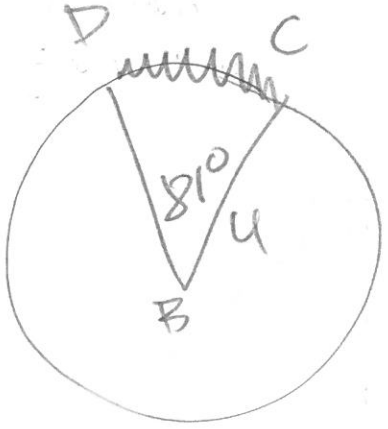
why $leg = -\sqrt{65}$ θ in III



$\tan\theta = \frac{-\sqrt{65}}{-4}$

$\boxed{\tan\theta = \frac{\sqrt{65}}{4}}$

⑩



$\theta = \frac{81}{180}\pi$ $r = 4$

$S = \theta r$

$= \frac{81\pi \cdot 4}{180}$

$= \boxed{\frac{9\pi}{5} \text{ in}}$

(11) $\sin\theta = 0$ $x = 0$ $x = 0$
$x = 180$ $x = \pi$
$x = 360$ $x = 2\pi$

$\cos\theta = 0$ $x = 90$ $x = \frac{\pi}{2}$
$x = 270$ $x = \frac{3\pi}{2}$

$\tan\theta = 0$ $x = 0$ $x = 0$
$x = 180$ $x = \pi$
$x = 360$ $x = 2\pi$

$\csc\theta = 0$ never

$\sec\theta = 0$ never

$\cot\theta = 0$ $x = 90$ $x = \frac{\pi}{2}$
$x = 270$ $x = \frac{3\pi}{2}$

(12) $\sin\theta = -1$ $x = 270$ $x = \frac{3\pi}{2}$
$\cos\theta = -1$ $x = 180$ $x = \pi$
$\tan\theta = -1$ $x = 135$ $x = 315$ $x = \frac{3\pi}{4}$ $x = \frac{7\pi}{4}$
$\csc\theta = -1$ $x = 270$ $x = \frac{3\pi}{2}$
$\sec\theta = -1$ $x = 180$ $x = \pi$
$\cot\theta = -1$ $x = 135$ $x = 315$
$x = \frac{3\pi}{4}$ $x = \frac{7\pi}{4}$

(13) $\sin\theta \neq$ undefined

$\cos\theta \neq$ undefined

$\tan\theta =$ und. $x = 90$ $x = \frac{\pi}{2}$

$x = 270$ $x = \frac{3\pi}{2}$

$\csc\theta =$ undefined $x = 0$ $x = 0$

$x = 180$ $x = \pi$

$x = 360$ $x = 2\pi$

$\sec\theta =$ undefined $x = 90$ $x = \frac{\pi}{2}$

$x = 270$ $x = \frac{3\pi}{2}$

(14) $\sin\theta = 1$ $x = 90$ $x = \frac{\pi}{2}$

$\cos\theta = 1$ $x = 0$ $x = 0$

$x = 360$ $x = 2\pi$

$\tan\theta = 1$ $x = 45$ $x = \frac{\pi}{4}$

$x = 225$ $x = \frac{5\pi}{4}$

$\csc\theta = 1$ $x = 90$ $x = \frac{\pi}{2}$

$\sec\theta = 1$ $x = 0$ $x = 0$

$x = 360$ $x = 2\pi$

$\cot\theta = 1$

$x = 45$ $x = \frac{\pi}{4}$

$x = 225$ $x = \frac{5\pi}{4}$

(15) 128.123° to DMS

$128^\circ + 0.123 \cdot 60' = 7.38'$

$128^\circ\ 7.38'$ DMinutes

$128^\circ 7' + 0.38(60)'' = 22.8''$

$128.123^\circ \longrightarrow \boxed{128^\circ 7' 22.8''}$

$54^\circ 16' 15''$ to DD

$54^\circ + \frac{16^\circ}{60} + \frac{15^\circ}{3600} = 54.2708\overline{3}$

$\approx \boxed{54.271^\circ}$

(16) 3200° lies in?

$$\begin{array}{r} 8 \text{ r } 320 \\ 360\,\overline{)\,3200} \\ \underline{2880} \\ 320 \end{array}$$

8 revs + 320°

QIV

OR

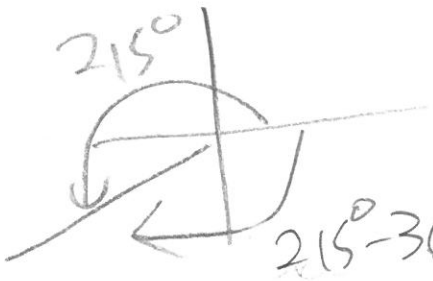
$8 \cdot \underline{\overline{888}}$

$0.\underline{\overline{888}} \cdot 360 = 320^\circ$

(17) $1295°$

$$\begin{array}{r} 3 \text{ r } 215 \\ 360 \overline{)1295} \\ \underline{1080} \\ 215 \end{array}$$

3 revs $215°$



$215° - 360° = -145$

Positive Coterminal

$215° + 360n$

Negative Coterminal

$-145° - 360n$

(18) $\frac{151}{9}\pi$

$$\begin{array}{r} 1\ \cancel{6} \text{ r } 7 \\ 9 \overline{)151} \\ \underline{9} \\ 61 \\ \underline{54} \\ 7 \end{array}$$

$\frac{151\pi}{9} = 16\frac{7}{9}\pi$

$\frac{7\pi}{9} - 2\pi$

$\frac{7\pi}{9} - \frac{18\pi}{9} = \frac{-11}{9}\pi$

Positive Coterminal

$\frac{7\pi}{9} + 2\pi n$

Negative Coterminal

$\frac{-11\pi}{9} - 2\pi n$

(18) Alternate Method

$$\frac{151\pi}{9} \cdot \frac{180}{\pi} = \frac{151}{1} \cdot \frac{20}{1} = 3020^\circ$$

$$360 \overline{)3020} \quad 8 \text{ r } 140$$
$$2880$$
$$140$$

8 revs $\frac{140}{360}$

$$140^\circ + 360n \longrightarrow \frac{140}{180}\pi + 2\pi n$$

$$\frac{7\pi}{9} + 2\pi n$$

$$-220^\circ + 360n \longrightarrow -\frac{220}{180}\pi = 2\pi n$$

$$-\frac{11}{9}\pi - 2\pi n$$

(19) $r = ?$

$$AL = \frac{15\pi}{2}$$

$$\theta = \frac{2\pi}{3}$$

$$S = \theta r$$

$$\frac{15\pi}{2} = \frac{2\pi}{3} r$$

$$\frac{\frac{15\pi}{2}}{\frac{2\pi}{3}} = \frac{15\pi}{2} \cdot \frac{3}{2\pi} = \frac{45\pi}{4\pi}$$

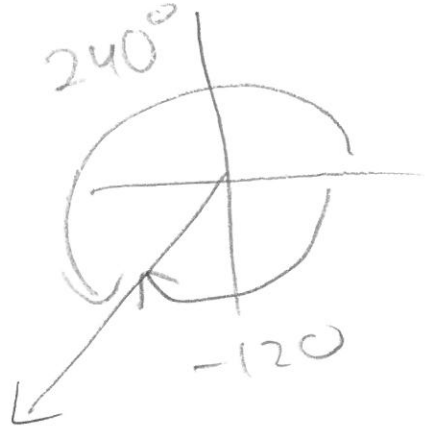
$$\boxed{r = 11\frac{1}{4}}$$

(20) -1560° lies?

$$360 \overline{)1560} \quad 4 \text{ r } 120$$
$$1440$$
$$120$$

4 revs 120°

QIII



(21) $\frac{-200\pi}{3}$ lies where?

$$3 \overline{)200} \quad 66 \text{ r } 1$$
$$18$$
$$20$$
$$18$$
$$2$$

$-66\frac{1}{3}\pi$

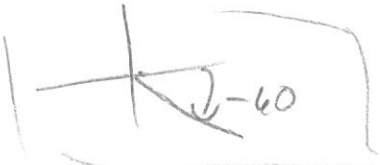
QIV

alternate method

OR $\frac{-200\pi}{3} \cdot \frac{180}{\pi} = \frac{-200}{1} \cdot \frac{60}{1} = -12300^\circ$

$$360 \overline{)12300} \quad 334 \text{ r } 60$$
$$1200$$
$$300$$
$$240$$
$$60$$

-334 revs $\frac{60}{360}$



(22) $\cot 45°$ $\tan 45 = 1$

$\cot 45 = 1$

(23) $\sin \frac{\pi}{6} = \sin 30 = \frac{1}{2}$

(24) $\cos \pi = \cos 180 = -1$

(25) $\tan -495 = \tan[-360 - 135]$

$\tan -135$

$\tan 225$

$\tan -495 = 1$

(26) $\cot -270$

$\cot 90$

$\tan 90 = \text{und}$

$\cot 90 = 0$

$\cot -270 = 0$

$\rightarrow \cot 90 = \frac{\cos 90}{\sin 90}$

$= \frac{0}{1}$

(27) $\sin 780 = \sin(720+60)$

$\sin 60 = \frac{\sqrt{3}}{2}$

$\boxed{\sin 780 = \frac{\sqrt{3}}{2}}$

(28) $\csc \frac{8\pi}{3} = \csc\left(2\pi + \frac{2\pi}{3}\right)$

$\csc(120°)$

$\sin 120° = \frac{\sqrt{3}}{2}$

$\frac{1}{\sin 120} = \frac{2}{\sqrt{3}}$

$\boxed{\csc \frac{8\pi}{3} = \frac{2\sqrt{3}}{3}}$

(29) $\sec\left(\frac{-7\pi}{4}\right)$

$\sec\left(\frac{\pi}{4}\right)$

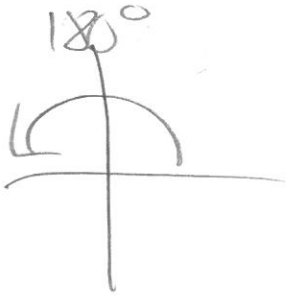
$\sec(45) = \frac{2}{\sqrt{2}}$

$\sec\left(\frac{-7\pi}{4}\right) = \frac{2\sqrt{2}}{2}$

$\boxed{\sec\left(\frac{7\pi}{4}\right) = \sqrt{2}}$

(30) $\tan 540$

$\tan(360+180)$



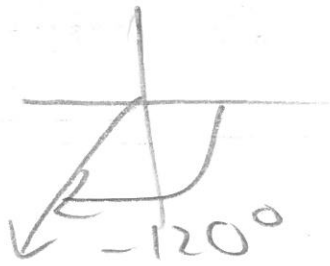
$\tan 180$

$\frac{\sin 180}{\cos 180} = \frac{0}{-1}$

$\boxed{\tan 540 = 0}$

(31) $\cos(-120°)$

$\cos(240)$



$-\cos(60) = -\frac{1}{2}$

$\boxed{\cos(-120) = -\frac{1}{2}}$

(32) $\boxed{\sec\theta < 0 \text{ in II, III}}$

because

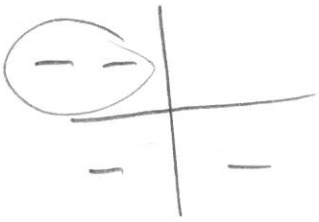
$\cos\theta < 0$ in II, III

(33) $\sin\theta > 0$ in I, II $\quad \cot\theta < 0$ in II, IV

QII

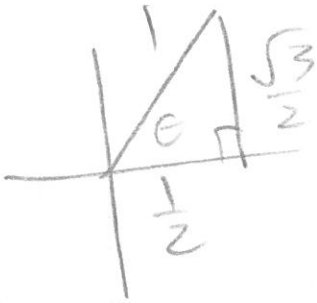
(34) $\cos\theta < 0$ < II, III

$\cot\theta < 0$ < II, IV



QII

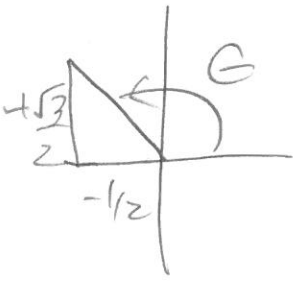
(35) $\sin\theta = \frac{\sqrt{3}}{2}$ in QI

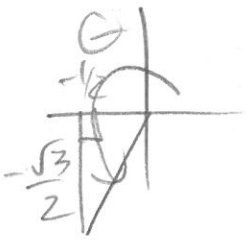


$\theta = 60°$

(36) $\sec\theta = -2$ < II, III

$\cos\theta = -\frac{1}{2}$ < II, III





$\theta = 120°$

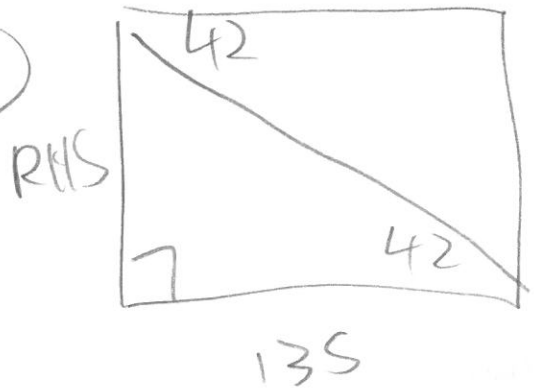
$\theta = 240°$

(37) $\cos\theta = 0$

$x = 90$

$x = 270$

(38)



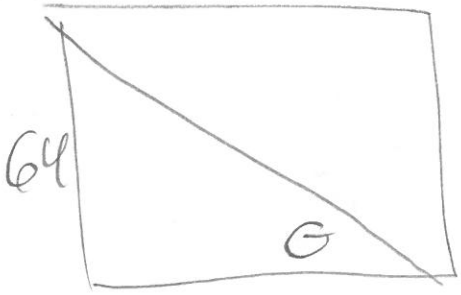
$\tan 42 = \frac{RHS}{135}$

$RHS = 135 \tan 42$

$\approx 121.5 \text{ ft}$

(39)

top Bleaches



M. S. $\tan\theta = \frac{64}{160}$

$\theta = \tan^{-1}\left(\frac{64}{160}\right)$

$\theta \approx 21.8014°$