Chapter 4 Review

1 a) $\cos\theta = \frac{\sqrt{3}}{2}$, $0° < \theta < 360°$

(triangle)

$\bar{\theta} = \cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$

$\bar{\theta} = 30°$

where is $\cos\theta > 0$

S | A
T | C

Q1	Q2
$\theta = 30°$	$\theta = 180° - 30° = 150°$

b) $\sin\theta = -\frac{\sqrt{2}}{2}$, $0 < \theta < 2\pi$

$\sin\theta = -\frac{1}{\sqrt{2}}$

(Triangle)

$\bar{\theta} = \sin^{-1}\left(\frac{1}{\sqrt{2}}\right)$

$\bar{\theta} = \frac{\pi}{4}$

where is $\sin\theta < 0$

S | A
T | C

Q3	Q4
$\theta = \pi + \frac{\pi}{4} = \frac{5\pi}{4}$	$\theta = 2\pi - \frac{\pi}{4} = \frac{7\pi}{4}$

c) $\cot\theta$ = undefined, $0° \le \theta \le 720°$

(unit circle)

$\theta = 0°, 180°, 360°$

$\theta = 540°, 720°$ (Add 360°)

d) $2\sin\theta - 1 = 0$, $-2\pi \le \theta \le 2\pi$

$\sin\theta = \frac{1}{2}$

(Triangle)

$\bar{\theta} = \sin^{-1}\left(\frac{1}{2}\right)$

$\bar{\theta} = \frac{\pi}{6}$

where is $\sin\theta > 0$

S | A
T | C

Q1	Q2
$\theta = \frac{\pi}{6}$	$\theta = \pi - \frac{\pi}{6} = \frac{5\pi}{6}$
$\theta = \frac{\pi}{6} - 2\pi = -\frac{11\pi}{6}$	$\theta = \frac{5\pi}{6} - 2\pi = -\frac{7\pi}{6}$

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① e) $\cos^2\theta + \frac{1}{2}\cos\theta = 0$, $0° \le \theta \le 360°$

$\cos\theta(\cos\theta + \frac{1}{2}) = 0$

$\cos\theta = 0$ (Unit Circle) $\theta = 90°, 270°$

$\cos\theta + \frac{1}{2} = 0$, $\cos\theta = -\frac{1}{2}$ (Triangle) $\bar{\theta} = 60°$

where is $\cos\theta < 0$

Q2	Q3
$\theta = 180° - 60°$	$\theta = 180° + 60°$
$\theta = 120°$	$\theta = 240°$

② a) $\frac{3}{1 - 2\sin\frac{3\pi}{4}}$

$\frac{3}{1 - 2\left(\frac{\sqrt{2}}{2}\right)}$

$\frac{3}{(1-\sqrt{2})}\cdot\frac{(1+\sqrt{2})}{(1+\sqrt{2})}$ Rationalize

$\frac{3+3\sqrt{2}}{1+\sqrt{2}-\sqrt{2}-2}$

$\frac{3+3\sqrt{2}}{-1}$ or $-3-3\sqrt{2}$

$\frac{3}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$; $\sin\frac{3\pi}{4} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

b) $\frac{2\cos 3\pi + \sin 11\frac{\pi}{4}}{\cos^2\frac{\pi}{6}}$

$\frac{2(-1) + \frac{\sqrt{2}}{2}}{\left(\frac{\sqrt{3}}{2}\right)^2}$

$\frac{-2 + \frac{\sqrt{2}}{2}}{\frac{3}{4}}$

$\left(\frac{-4}{2} + \frac{\sqrt{2}}{2}\right)\cdot\frac{4}{3}$ multiply by reciprocal

$\left(\frac{-4+\sqrt{2}}{2}\right)\cdot\frac{4}{3}$

$\frac{-16+4\sqrt{2}}{6}$ → reduce → $\frac{-8+2\sqrt{2}}{3}$

$\cos 3\pi = -1$; $\frac{5\pi}{4}, \frac{7\pi}{4}, \frac{3\pi}{4}$; $\sin\frac{11\pi}{4} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\cos\frac{\pi}{6} = \frac{\sqrt{3}}{2}$

③ b) $\frac{\sin^2 225°}{8\sin 120°}$

$\frac{\left(\frac{-1}{\sqrt{2}}\right)^2}{8\left(\frac{\sqrt{3}}{2}\right)}$

$\frac{\frac{1}{2}}{4\sqrt{3}}$

$\frac{1}{2}\times\frac{1}{4\sqrt{3}}$

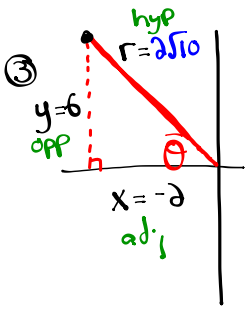
$\frac{1}{8\sqrt{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}}$

$\frac{\sqrt{3}}{24}$

$\sin 225° = \frac{-1}{\sqrt{2}}$; $\sin 120° = \frac{\sqrt{3}}{2}$

Ch. 4 Review

③



① Find r:

$x^2+y^2=r^2$

$(-2)^2+(6)^2=r^2$

$4+36=r^2$

$40=r^2$

$\sqrt{40}=r$

$\sqrt{2\cdot2\cdot2\cdot5}=r$

$2\sqrt{10}=r$

② $\sin\theta=\frac{6}{2\sqrt{10}}=\frac{3}{\sqrt{10}}=\frac{3\sqrt{10}}{10}$

$\cos\theta=\frac{-2}{2\sqrt{10}}=\frac{-1}{\sqrt{10}}=\frac{-\sqrt{10}}{10}$

$\tan\theta=\frac{6}{-2}=-3$

$\csc\theta=\frac{\sqrt{10}}{3}$

$\sec\theta=-\sqrt{10}$

$\cot\theta=-\frac{1}{3}$

} Reciprocal Ratios

④ $\sec\theta=-\frac{\sqrt{11}}{3}$ hyp / adj and $\tan\theta>0$ ($\cos\theta<0$)

Given:

$r=\text{hyp}=\sqrt{11}$

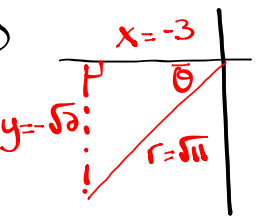
$x=\text{adj}=-3$

① • $\cos\theta<0$
• $\tan\theta>0$

~~S~~	~~A~~
~~T~~	C

θ is in Q3

②



$x^2+y^2=r^2$

$(-3)^2+y^2=(\sqrt{11})^2$

$9+y^2=11$

$y^2=2$

$y=\pm\sqrt{2}$

$y=-\sqrt{2}$ Q3

③ $\sin\theta=\frac{-\sqrt{2}}{\sqrt{11}}=-\frac{\sqrt{22}}{11}$

$\cos\theta=\frac{-3}{\sqrt{11}}=-\frac{3\sqrt{11}}{11}$

$\tan\theta=\frac{-\sqrt{2}}{-3}=\frac{\sqrt{2}}{3}$

$\csc\theta=-\frac{\sqrt{11}}{\sqrt{2}}=-\frac{\sqrt{22}}{2}$

$\cot\theta=\frac{3}{\sqrt{2}}=\frac{3\sqrt{2}}{2}$

Ch. 4 Review

⑤ a) $\frac{2\pi}{9}$

$A_c = \frac{2\pi}{9} + 2\pi$

$= \frac{2\pi}{9} + \frac{18\pi}{9}$

$= \frac{20\pi}{9}$

$A_c = \frac{2\pi}{9} - 2\pi$

$= \frac{2\pi}{9} - \frac{18\pi}{9}$

$= -\frac{16\pi}{9}$

b) -900°

$A_c = -900^\circ + 1080^\circ$

$= 180^\circ$

$A_c = -900^\circ - 360^\circ$

$= -1260^\circ$

c) 300°

$A_c = 300^\circ + 360^\circ$

$= 660^\circ$

$A_c = 300^\circ - 360^\circ$

$= -60^\circ$

Attachments

Worksheet - Sketching Angles in Radians.doc