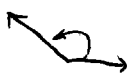
Math 110 – Prof. Richard B. Goldstein – Larson 8th Ed – Chap 8 HW

Sect 8.1

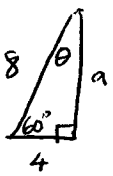
#5 (A)  $\theta = \frac{\pi}{9}$ $\frac{\pi}{9} + 2\pi = \boxed{\frac{19\pi}{9}}$ $\frac{\pi}{9} - 2\pi = \boxed{-\frac{17\pi}{9}}$

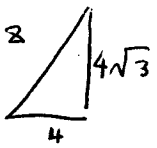
(B)  $\theta = \frac{2\pi}{3}$ $\frac{2\pi}{3} + 2\pi = \boxed{\frac{8\pi}{3}}$ $\frac{2\pi}{3} - 2\pi = \boxed{-\frac{4\pi}{3}}$

#19

$330^\circ \equiv 330\,\frac{\pi}{180} = \boxed{\frac{11\pi}{6}}$

#25 $-\frac{\pi}{12} \equiv -\frac{\pi}{12} \cdot \frac{180}{\pi} = \boxed{-15^\circ}$

#37  $\theta = 180 - 90 - 60 = \boxed{30^\circ}$



$a^2 = 8^2 - 4^2 = 64 - 16 = 48$

$a = \sqrt{48} = \sqrt{16 \cdot 3} = \boxed{4\sqrt{3}}$

#52 CD 3142 $\frac{\text{radians}}{\text{min}}$ 2π radians = 1 revolution

$2(3.142\ldots) = 6.284$

(A) $\frac{3.142}{6.284} = \boxed{500 \text{ revs/min}}$ (B) $\frac{10000}{500} = \boxed{20 \text{ minutes}}$

Sect 8.2

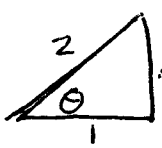
#5  $x = -\sqrt{3}$, $y = 1$, $r = \sqrt{x^2+y^2} = \sqrt{3+1} = 2$

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

$\cos\theta = \frac{\sqrt{3}}{2}$ $\sec\theta = -\frac{2}{\sqrt{3}} = -\frac{2\sqrt{3}}{3}$

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

#15 $\sec\theta = 2 = \frac{1}{\cos\theta}$



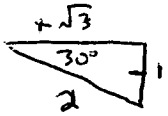
$\sqrt{3} = \sqrt{2^2 - 1^2}$

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

$\tan\theta = \frac{\sqrt{3}}{1} = \sqrt{3}$ $\cot\theta = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

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

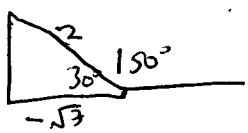
#33 (a) $-\frac{\pi}{6} \equiv -30^\circ$



$\sin\theta = -1/2$

$\cos\theta = +\sqrt{3}/2$

$\tan\theta = -1/+\sqrt{3} = -\sqrt{3}/3$

(b) 150° 

$\sin\theta = \frac{1}{2}$ $\tan\theta = \frac{1}{-\sqrt{3}} = -\frac{\sqrt{3}}{3}$

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

#57 $\sin 2\theta - \cos\theta = 0 \Rightarrow 2\sin\theta\cos\theta - \cos\theta = 0$

$\cos\theta(2\sin\theta - 1) = 0$

$\cos\theta = 0$ at $\boxed{\theta = \frac{\pi}{2}, \frac{3\pi}{2}}$

$\sin\theta = \frac{1}{2}$ at $\boxed{\theta = \frac{\pi}{6}, \frac{5\pi}{6}}$

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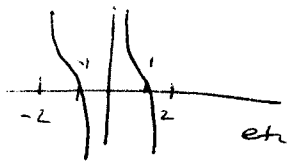
Sect 8,3

#5 $y = \frac{1}{2}\cos \pi x$ $\quad \pi x = 2\pi$ $\quad \boxed{x = 2}$ period $\quad \boxed{\text{alt.} = \frac{1}{2}}$

#17 $y = 3\sec 5x$ $\quad 5x = 2\pi$ $\quad \boxed{x = \frac{2}{5}\pi}$ period

#23 $y = \cot \frac{\pi x}{2}$ $\quad \frac{\pi x}{2} = \pi$ $\quad \boxed{x = 2 \text{ period}}$

(f)



#49 $f(x) = \frac{\sin x}{5x}$

x	-0.1	-0.01	-0.001	0.001	0.01	0.1
$f(x)$	0.19966	0.19^46..	0.2	0.2	0.199996	0.19966

$\lim_{x \to 0} \frac{\sin x}{5x} = \frac{1}{5} = 0.2$

Sect 8.4

#15 $y = \cos^3 x + \sin^2 x$ $\quad y' = (-\sin 3x)\,3 + 2\sin x \cos x = \boxed{-3\sin 3x + \sin 2x}$

#23 $y = 2\tan^2 4x \Rightarrow$ $\quad y' = 2 \cdot (2\tan 4x) \cdot \sec^2 4x \cdot 4 = \boxed{16 \tan 4x \sec^2 4x}$

#37 $y = \ln(\sin^2 x) = 2\ln(\sin x)$ $\quad y' = 2\left(\frac{1}{\sin x}\right)\cdot(+\cos x) = \boxed{2\cot x}$

#49 $y = 2\sin x + 3\cos x$
$y' = 2\cos x - 3\sin x$
$y'' = -2\sin x - 3\cos x$

$y'' + y = -2\sin x - 3\cos x + 2\sin x + 3\cos x = 0$ ✓

Sect 8,5

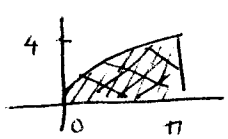
#1 $\int 2\sin x + 3\cos x \, dx = \boxed{-2\cos x + 3\sin x + c}$

#5 $\int \csc^2\theta - \cos\theta \, d\theta = \boxed{-\cot\theta - \sin\theta + c}$

#9 $\int 2x \cos x^2 \, dx$ $\quad u = x^2$, $du = 2x\,dx$ $\quad \int \cos u \, du = \sin u + c = \boxed{\sin x^2 + c}$

#25 $\int \frac{\sin x}{1+\cos x} \, dx$ $\quad u = 1 + \cos x$, $du = -\sin x\,dx$ $\quad \int -\frac{1}{u}\,du = -\ln u + c = \boxed{-\ln(1+\cos x) + c}$

#49



$y = x + \sin x$ $\quad \int_0^{\pi} x + \sin x \, dx = \frac{x^2}{2} - \cos x \Big|_0^{\pi} = \left(\frac{\pi^2}{2} + 1\right) - (0 - 1)$

$= \boxed{\frac{\pi^2}{2} + 2} \sim 6.9348$