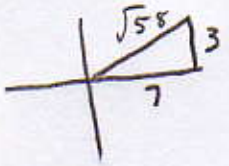
CHAP 2

1. $150^\circ \cdot \frac{\pi}{180} = \frac{150\pi}{180} = \frac{5\pi}{6}$

2. $\pi - \frac{11\pi}{12} = \frac{12\pi}{12} - \frac{11\pi}{12} = \frac{\pi}{12}$

3. $\tan\theta = \frac{3}{7}$



$3^2 + 7^2 = r^2$

$9 + 49$

$\sqrt{58} = \sqrt{r^2}$

$\sqrt{58} = r$

FIND $\sec\theta$

$\sec\theta = \frac{1}{\cos\theta} = \frac{1}{\frac{7}{\sqrt{58}}} = \frac{\sqrt{58}}{7}$

4. $\tan\frac{\pi}{6} \cdot \cos\frac{\pi}{3} - \sin\frac{\pi}{2}$

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

$\frac{\sqrt{3}}{6} - 1\frac{6}{6} = \frac{-6+\sqrt{3}}{6}$

5. $\frac{11\pi}{6}$

6. $\frac{\sec^2 x - 1}{\sec^2 x} = \frac{\sec^2 x}{\sec^2 x} - \frac{1}{\sec^2 x}$

$1 - \frac{1}{\sec^2 x}$

$1 - \cos^2 x$

$\sin^2 x$

7. $y = -4\tan 3x$

b

$\frac{\pi}{b}$ = PERIOD

$\frac{\pi}{3}$

8. $y = -3\cos\left(2x + \frac{\pi}{2}\right)$

$y = -3\cos\left(2\left(x + \frac{\pi}{4}\right)\right)$

AMPLITUDE = 3

PERIOD = $\frac{2\pi}{b} = \frac{2\pi}{2} = \pi$

PHASE SHIFT = LEFT $\frac{\pi}{4}$ OR $-\frac{\pi}{4}$

9. $y = 2\cot\left(\frac{\pi}{3}x + \frac{\pi}{6}\right)$

$y = 2\cot\left(\frac{\pi}{3}\left(x + \frac{1}{2}\right)\right)$

PERIOD = $\frac{\pi}{b} = \frac{\pi}{\frac{\pi}{3}}$ $\pi \cdot \frac{3}{\pi} = \boxed{3}$

PHASE SHIFT = LEFT $\frac{1}{2}$ OR $-\frac{1}{2}$

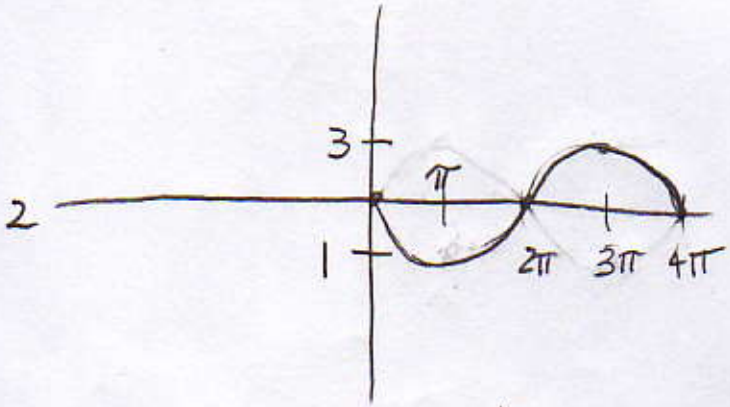
10. $y = 2 - \sin\left(\frac{1}{2}x\right)$

VERTICAL SHIFT UP 2

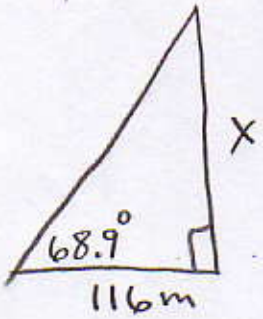
REFLECTED ABOUT X-AXIS

PERIOD $\frac{2\pi}{\frac{1}{2}} = 4\pi$

AMPLITUDE 1



11.



$\tan 68.9 = \frac{x}{116}$

$116 \cdot \tan 68.9 = x$

$\boxed{300.6\text{ m} = x}$

CHAPTER 3

12. $1 + \sin^2 x \sec^2 x = \sec^2 x$

$1 + \sin^2 x \cdot \frac{1}{\cos^2 x}$

$1 + \frac{\sin^2 x}{\cos^2 x}$

$1 + \tan^2 x$

$\sec^2 \theta = \sec^2 \theta$ Q.E.D.

13. $\cos^3 x + \cos x \sin^2 x = \cos x$

$\cos x(\cos^2 x + \sin^2 x)$

$\cos x \cdot 1$

$\cos x = \cos x$ Q.E.D,

14. $\csc x - \cot x = \frac{1 - \cos x}{\sin x}$

$\frac{1}{\sin x} - \frac{\cos x}{\sin x}$

$\frac{1 - \cos x}{\sin x} = \frac{1 - \cos x}{\sin x}$ Q.E.D.

15. $\cos x + \sin x \tan x = \sec x$

$\cos x + \sin x \left(\frac{\sin x}{\cos x}\right)$

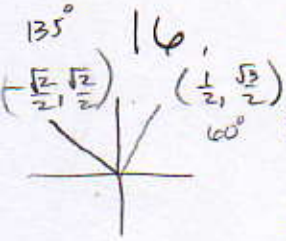
$\left(\frac{\cos x}{\cos x}\right)\cos x + \frac{\sin^2 x}{\cos x}$

$\frac{\cos^2 x + \sin^2 x}{\cos x} = \frac{1}{\cos x} = \sec x$ Q.E.D.

16. $\sin 195^\circ$

$\sin(135^\circ + 60^\circ)$

$\left(\sin(A+B) = \sin A \cos B + \cos A \sin B\right)$

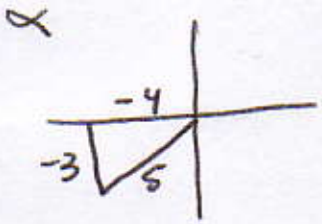


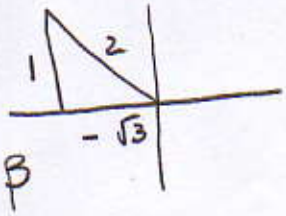
$\sin 135^\circ \cos 60^\circ + \cos 135^\circ \sin 60^\circ$

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

$\frac{\sqrt{2}}{4} - \frac{\sqrt{6}}{4} = \boxed{\frac{\sqrt{2}-\sqrt{6}}{4}}$

17. $\sin\alpha = -\frac{3}{5}$ $\quad \cos\beta = -\frac{\sqrt{3}}{2}$





$\sin(\alpha+\beta)$

$\sin\alpha\cos\beta + \cos\alpha\sin\beta$

$\left(-\frac{3}{5}\right)\left(-\frac{\sqrt{3}}{2}\right) + \left(\frac{-4}{5}\right)\left(\frac{1}{2}\right)$

$\frac{3\sqrt{3}}{10} - \frac{4}{10} = \boxed{\frac{3\sqrt{3}-4}{10}}$

18. $\sin\left(\theta - \frac{3\pi}{2}\right) = \cos\theta$

$\sin\theta\cos\left(-\frac{3\pi}{2}\right) - \cos\theta\sin\left(-\frac{3\pi}{2}\right)$

$\sin\theta \cdot 0 - \cos\theta(-1)$

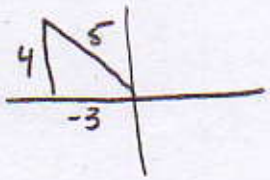
$\boxed{\cos\theta}$

19. $\sin 6x \cos 3x + \cos 6x \sin 3x$

$\sin(6x+3x)$

$\boxed{\sin 9x}$

20. $\cos 2\theta$



$\cos^2\theta - \sin^2\theta$

$\left(\frac{-3}{5}\right)^2 - \left(\frac{4}{5}\right)^2$

$\frac{9}{25} - \frac{16}{25} = \boxed{\frac{-7}{25}}$

21. $\sin 15^\circ \cos 75^\circ$

HALF ANGLES →

$\sin \frac{30}{2} \cos \frac{150}{2}$

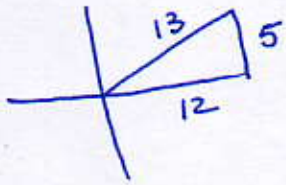
$\sqrt{\frac{1-\cos\alpha}{2}} \cdot \sqrt{\frac{1+\cos\alpha}{2}}$

$\sqrt{\frac{1-\cos 30}{2}} \cdot \sqrt{\frac{1+\cos 150}{2}}$

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

$\frac{1}{2}\left(1-\frac{\sqrt{3}}{2}\right) = \frac{1}{2} - \frac{\sqrt{3}}{4} = \boxed{\frac{2-\sqrt{3}}{4}}$

22. $\sin\left(\cos^{-1}\frac{12}{13}\right)$ $\quad \theta = \cos^{-1}\frac{12}{13}$



$\sin\theta = \boxed{\frac{5}{13}}$

23. $2\sin x - \sqrt{3} = 0$

$+\sqrt{3} \quad +\sqrt{3}$

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

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

$\boxed{\frac{\pi}{3}, \frac{2\pi}{3}}$

24. $\sin x \cos x - \frac{\sqrt{3}}{2}\sin x = 0$

$\sin x\left(\cos x - \frac{\sqrt{3}}{2}\right) = 0$

$\sin^{-1}\sin x = \sin^{-1} 0$ | $\cos x - \frac{\sqrt{3}}{2} = 0$

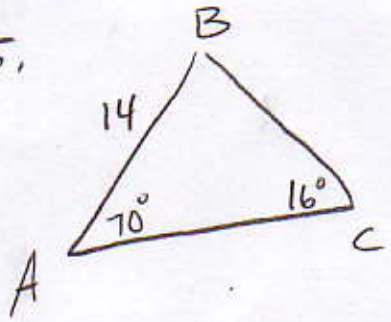
$0, \pi$ | $+\frac{\sqrt{3}}{2} \quad +\frac{\sqrt{3}}{2}$

$\cos^{-1}\cos x = \cos^{-1}\frac{\sqrt{3}}{2}$

$x = \frac{\pi}{6}, \frac{11\pi}{6}$

CHAPTER 4

25.



$m\angle B = 180 - 70 - 16$

$m\angle B = 94°$

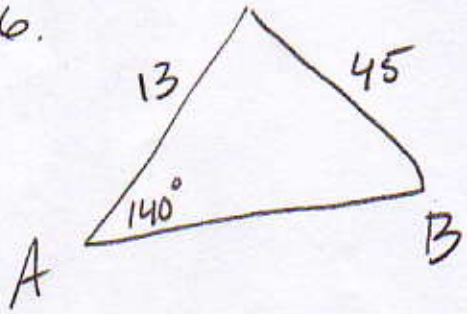
$\frac{14}{\sin 16} = \frac{a}{\sin 16}$

$14 = a$

$\frac{14}{\sin 94} = \frac{b}{\sin 16}$

$b = 50.66$

26.

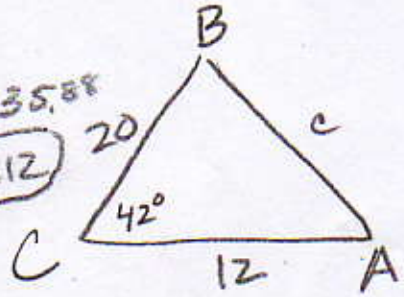


$\frac{\sin B}{13} = \frac{\sin 140}{45}$

$\sin^{-1}\sin B = \sin^{-1} .1857$

$B = 10.7°$

27.



$LC = 180 - 42 - 35.88$

$LC = 102.12$

$c^2 = a^2 + b^2 - 2ab\cos C$

$20^2 + 12^2 - 2(20)(12)\cos 42$

$\sqrt{c^2} = \sqrt{187.29}$

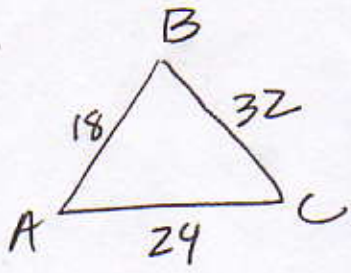
$c = 13.7$

$\frac{\sin B}{12} = \frac{\sin 42}{13.7}$

$\sin^{-1}\sin B = \sin^{-1} .5861$

$B = 35.88°$

28.



$\cos A = \dfrac{b^2 + c^2 - a^2}{2bc}$

$\cos A = \dfrac{24^2 + 18^2 - 32^2}{2 \cdot 24 \cdot 18}$

$\cos^{-1} \cos A = \cos^{-1} -.1435$

$A = 98.25°$

$\dfrac{18 \sin 98.25°}{32} = \dfrac{\sin C}{18}$

$\sin^{-1} .5567 = \sin^{-1} \sin C$

$33.8° = C$

$180 - 98.25 - 33.8 = \angle B$

$47.95 = \angle B$

29. $\sqrt{57(57-17)(57-55)(57-42)}$

$s = \dfrac{17 + 55 + 42}{2}$

$s = 57$

$\sqrt{68400}$

261.53 SQ UNITS

30. $\|v\| = \sqrt{(-2)^2 + (3)^2}$

$\|v\| = \sqrt{4+9}$

$\|v\| = \sqrt{13}$

31. $3u - 5v$

$u = 2i - 3j \quad \langle 2, -3 \rangle$

$v = 5i + 4j \quad \langle 5, 4 \rangle$

$3\langle 2, -3 \rangle - 5\langle 5, 4 \rangle$

$\langle 6, -9 \rangle + \langle -25, -20 \rangle$

$\langle -19, -29 \rangle$

32. $u = \langle -2, 3 \rangle \quad v = \langle 5, 3 \rangle$

$u \cdot v = -2(5) + 3(3)$

$-10 + 9$

$\boxed{-1}$

33. $u = \langle 3, 5 \rangle \quad v = \langle -6, 2 \rangle$

$\cos^{-1}\left(\frac{u \cdot v}{\|u\| \|v\|}\right) \quad \cos^{-1}\left(\frac{3(-6) + 5(2)}{\sqrt{3^2+5^2} \cdot \sqrt{(-6)^2+2^2}}\right)$

(-18 and 10 above the numerator; $9+25$ and $36+4$ under the radicals)

$\cos^{-1}\left(\frac{-8}{\sqrt{34} \cdot \sqrt{40}}\right) = \cos^{-1}(-.2169)$

$= \boxed{102.5^\circ}$

CHAPTER 5

34. $6 + \sqrt{-9}$

$\boxed{6 + 3i}$

35. $\sqrt{-18} = \boxed{3i\sqrt{2}}$

$2 \cdot 9$

$3 \cdot 3$

36. $(3 + \sqrt{-4}) + (7 - \sqrt{-9})$

$(3 + 2i) + (7 - 3i) = \boxed{10 - i}$

37. $(-1 + \sqrt{-25}) - (8 - \sqrt{-16})$

$(-1 + 5i) + (-8 + 4i)$

$\boxed{-9 + 9i}$

38. $\sqrt{-12} \cdot \sqrt{-3}$

$2i\sqrt{3} \cdot \sqrt{3}\, i$

$2 \cdot 3 \cdot i^2 = \boxed{-6}$