MAC 1114 Review 02 Ans

1) $y = 4 \sin \frac{1}{3}x$. $A = |4| = 4$

$P = \frac{2\pi}{1/3} = 6\pi$.

2) $y = -3 \cos \frac{1}{2}x$ $A = |-3| = 3$

$P = \frac{2\pi}{1/2} = 4\pi$.

3) $y = 5 \sin(7x - \pi/2)$ $A = |5| = 5$

$P = \frac{2\pi}{7}$

4) $y = \frac{1}{2} \sin(3x + \pi)$

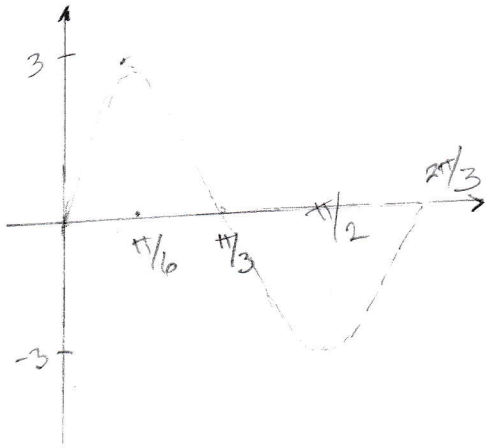
$3x + \pi = 0$, $3x = -\pi$, $x = -\pi/3$

5) $y = 2 \sin(2x - \pi/2)$ $2x - \pi/2 = 0$ $\therefore$ $2x = \pi/2$, $x = \pi/4$

6) $y = 3 \sin 3x$

$A = 3$

$P = 2\pi/3$



$\frac{P}{4} = \frac{2\pi}{3}/4 = \frac{\pi}{6}$ ✓

$\pi/6 + \pi/6 = \frac{2\pi}{6} = \pi/3$ ✓

$\pi/3 + \frac{\pi}{6} = \pi/2$ ✓

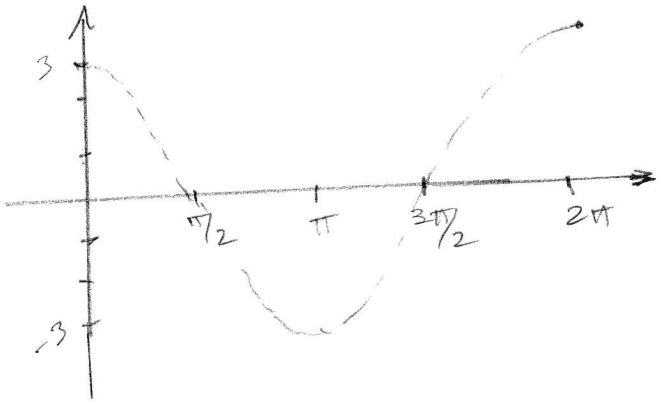
$\pi/2 + \pi/6 = \frac{2\pi}{3}$ ✓

7) $y = 5\cos\left(\frac{1}{2}x + \pi/2\right)$ $\quad \frac{1}{2}x + \pi/2 = 0, \quad \frac{1}{2}x = -\pi/2$

$x = -\pi$

8) $\sin^{-1}\frac{\sqrt{2}}{2} = \pi/4$

9) $y = 3\cos x$



10) $\tan^{-1}(-1.9) = -1.086 \approx -1.09$

11) $\sin^{-1}(0.1) = 0.1$

12) $\cos(\sin^{-1} 4/5) = 3/5$

13) $\csc\left(\tan^{-1}\frac{\sqrt{3}}{3}\right) = \csc(\pi/6) = \frac{1}{\sin \pi/6} = \frac{1}{1/2} = 2.$

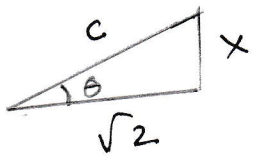
14) $\cot\left(\sin^{-1}\frac{\sqrt{2}}{2}\right) = \cot(\pi/4) = \frac{1}{\tan \pi/4} = \frac{1}{1} = 1$

15) $\cos^{-1}(-1/3) = 1.91$

16) $\sin^{-1} 3/7 = 0.4429 \approx \underline{0.44}$

17) $\sin\left(\tan^{-1}\frac{x}{\sqrt{2}}\right)$ $\therefore$ $\tan^{-1}\frac{x}{\sqrt{2}} = \theta$.

the angle whose tangent is $\frac{x}{\sqrt{2}}$



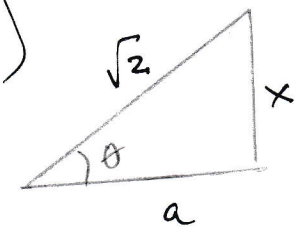
$\tan\theta = \frac{\text{opp}}{\text{Adj}} = \frac{x}{\sqrt{2}}$

by pythagorean th:

$c^2 = x^2 + (\sqrt{2})^2$, $c = \sqrt{x^2+2}$

$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{x}{\sqrt{x^2+2}} \cdot \frac{\sqrt{x^2+2}}{\sqrt{x^2+2}} = \frac{x\sqrt{x^2+2}}{x^2+2}$

18) $\cos\left(\sin^{-1}\frac{x}{\sqrt{2}}\right)$



$\sin^{-1}\frac{x}{\sqrt{2}} = \theta$ the angle whose sine is $x/\sqrt{2}$

$\text{sine} = \frac{\text{opp}}{\text{hyp}}$.

by pythagorean:

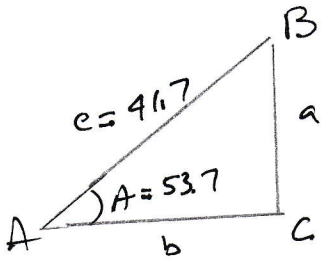
$(\sqrt{2})^2 = a^2 + x^2$ $\therefore$ $2 = a^2 + x^2$

$\sqrt{2-x^2} = a$.

$\cos\theta = \frac{\text{adj}}{\text{hyp}} = \frac{\sqrt{2-x^2}}{\sqrt{2}}$

$\cos\theta = \frac{\sqrt{2-x^2}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2(2-x^2)}}{2}$

19)



$\cos 53.7^\circ = b/c$

$\therefore b = c \times \cos 53.7^\circ$

$b = 41.7 \times \cos 53.7^\circ = 24.68$

$b = 24.7$

$\angle A + \angle B = 90$

$\therefore \angle B = 90 - \angle A = 90 - 53.7 = \underline{36.3^\circ}$

$c^2 = a^2 + b^2 \quad \therefore \quad a = \sqrt{c^2 - b^2} = \sqrt{41.7^2 - 24.7^2}$

$a = 33.59 \approx \underline{33.6}$

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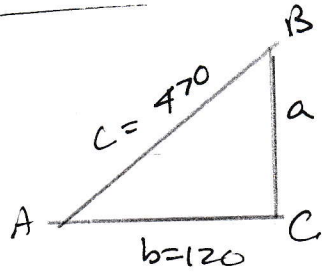
20)



$\cos A = \frac{120}{470} \quad \therefore \cos A = \frac{12}{47}$

$A = \cos^{-1} 12/47$

$A = 75.2^\circ$

$c^2 = a^2 + b^2 \quad \therefore \quad a = \sqrt{c^2 - b^2}$

$a = \sqrt{470^2 - 120^2} = 454.4$

$\angle A + \angle B = 90^\circ \quad \therefore \quad \angle B = 90 - \angle A$

$\angle B = 90 - 75.2 = 14.8$

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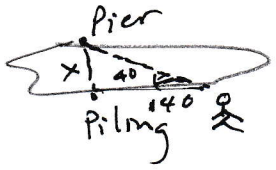
21)



$\tan 40^\circ = \frac{x}{140} \quad \therefore \quad x = 140 \tan 40^\circ$

$x = 117.47$

$x = 117$ ft

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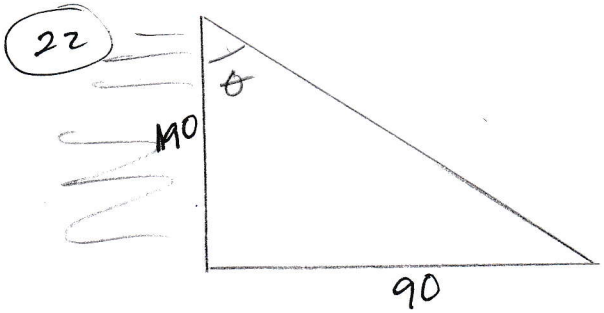
22)



$\tan\theta = \frac{90}{190} \quad \therefore \quad \tan\theta = \frac{9}{19}$

$\therefore \tan^{-1} \frac{9}{19} = \theta$

$= 25.3$

$\approx 25^\circ$