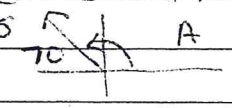
Non-Calc Review

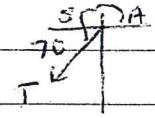
(1) (a) $\cos 110°$



$\cos 110° = -\cos 70°$

$\boxed{-.342}$

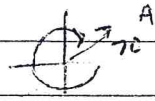
(b) $\cos 250°$



$\cos 250° = -\cos 70°$

$\boxed{-.342}$

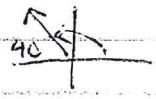
(c) $\cos(-290°)$



$\cos(-290°) = \cos 70°$

$\boxed{.342}$

(2) (a) $\sin 140°$



$\sin 140° = \sin 40°$

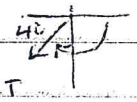
$\boxed{.643}$

(b) $\sin 320°$

$\sin 320° = -\sin 40$

$\boxed{-.643}$

(c) $\sin(-140°)$



$\sin(-140) = -\sin 40$

$\boxed{-.643}$

(3) (a) $\cos x = -1/2$

Ref $60°$

S | A
T | C

$\boxed{120°, 240°}$
$\boxed{-240°, -120°}$

(b) $\tan x = 1/\sqrt{3}$ or $\tan x = \sqrt{3}/3$

Ref $30°$

S | A
T | C

$\boxed{30°, 210°}$
$\boxed{-330°, -150°}$

(c) $2\sin^2 x - \sin x = 1$

$2\sin^2 x - \sin x - 1 = 0$

$(2\sin x + 1)(\sin x - 1) = 0$

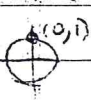
$\sin x = -1/2$

Ref $30°$

S | A
T | C

$\boxed{210°, 330°}$
$\boxed{-150°, -30°}$

$\sin x = 1$



$\boxed{90°}$
$\boxed{-270°}$

(4) $\sin 2x + \sin x = 0$

$2\sin x \cos x + \sin x = 0$

$\sin x (2\cos x + 1) = 0$

$\sin x = 0$ ⊕ $[0, \pi]$

$\cos x = -\frac{1}{2}$ Ref $\pi/3$ (S) A (T) C $2\pi/3$

(5) vertical shift: 6 (up) @ $a = 5$ ~~$b = 7$~~ $c = 4$ $d = 6$

amplitude: 5

hor. shift: 4 (right) (ii) period = 8

period = $2\pi/b$ $b = 2\pi/\text{period}$

$2\pi \div 8 = \pi/4$

(b) $f(x) > 6$ means above midline

(4, 8)

(6) $\cos x = 2/5$ Q1

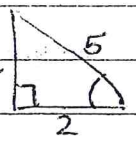
(a) $\sin x$

use $\sin^2 x + \cos^2 x = 1$

$(\sin x)^2 + (2/5)^2 = 1$

$(\sin x)^2 = 21/25$

$\sin x = \sqrt{21}/5$

or 

$2^2 + a^2 = 5^2$

$a^2 = 21$ $a = \sqrt{21}$

$\sin x = \sqrt{21}/5$

(b) $\tan x$

$\frac{\sin x}{\cos x} = \frac{\sqrt{21}/5}{2/5} = \frac{\sqrt{21}}{2}$ or $\tan x = \frac{\sqrt{21}}{2}$

(c) $\sin 2x$

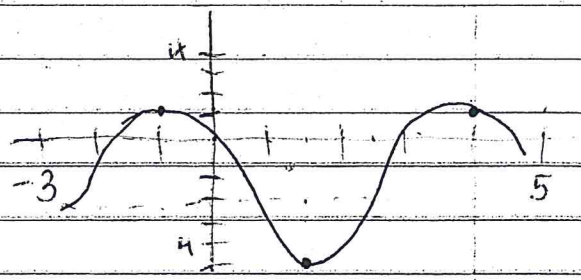
$2\sin x \cos x = 2(\sqrt{21}/5)(2/5) = 4\sqrt{21}/25$

(7) period = $2\pi/2\pi/5 = 5$

hor. shift = -1 (left 1)

ver. shift = -2 (down)

amp = 3 (vertical stretch)



Calc Review

1) (a) $\sin x = 0.75$

$\sin^{-1}(.75) = 48.6°$

S	A	48.6, 131.4
T	C	

(b) $\cos x = -0.63$

$\cos^{-1}(0.63) = 50.9$

S	A	129.1, 230.9
T	C	-129.1

(c) $\tan x = -2.8$

$\tan^{-1}(2.8) = 70.3$

S	A	109.7, 289.7
T	C	-70.3

or

Solve by graphing

@ graph $y = \sin x$ & $y = .75$

window $-180 \le x \le 360$ DEGREE!

use intersect to solve!

2) Solve by graphing! window $-2\pi \le x \le 2\pi$ Radian!

(a) graph $y = 2\sin x$

$y = \cos(x/3)$

intersect:

$-3.36, 0.515, 2.85, 6.06$

(b) graph $y = \cos x$

$y = 3x - 1$

intersect: 0.607

(c) graph $y = 2\tan(x/5)$

$y = 4x - x^3$

intersect: $-1.89, 0, 1.89$

3) midline: $y = 3$

amp: 4

period: 4 period $= 2\pi/b$ $b = 2\pi/\text{period}$

~~hor. shift: 2~~ $b = 2\pi/4 = \pi/2$

(a) $a = -4$ (since no hor. shift)

$b = \pi/2$

$c = 3$

(b) graph $y = -4\cos(\pi/2 x) + 3$

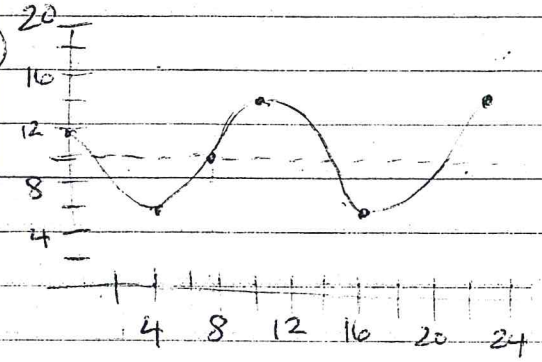
$y = 1$

window $0 \le x \le 7$ Radian!

intersect

0.667, 3.33, 4.67

(4)



Half the distance

(a) P = amp : $\frac{14-6}{2} = 4$

Q = hor. shift : $\frac{10+4}{2} = 7$

average between peak & valley

(c) t = 2 2:00

(d) from 2–6, 14–18 = 8 hrs total

(5) A = amplitude = half the distance

$\frac{15-9.35}{2} = 2.825$

B = vertical shift = average of vertical distances

$\frac{15+9.35}{2} = 12.175$

(b) $h(x) = 2.825 \sin(0.0172(x-86)) + 12.175$

Feb 1st = x = 32

plug & chug → 9.91 hrs