Math 1113 Sample Test 2 solutions

1) $\frac{\pi}{2} = 90°$ (B)

2) $8° \; 8' \; 8''$

calculator (8.135)

or $8° + \frac{8}{60} + \frac{8}{3600}$

3) $240° \cdot \frac{\pi}{180°} = \frac{4\pi}{3}$

4) $-90° \cdot \frac{\pi}{180°} = \frac{-\pi}{2}$

5) $\frac{\pi}{3} \cdot \frac{180°}{\pi} = -60°$

6) $\frac{\pi}{9} \cdot \frac{180°}{\pi} = 20°$

7) $s = r\theta$

$r = \frac{s}{\theta} = \frac{7}{1/2} = 14$

8) careful! must convert 24° to radians first!

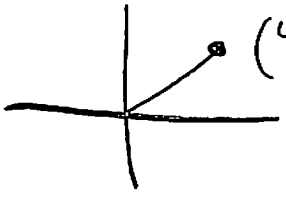
$24° \cdot \frac{\pi}{180°} = \frac{2\pi}{15}$

$s = r\theta$

$s = 70\left(\frac{2\pi}{15}\right)$

$= 29.322$

9) $P = \left(\frac{4\sqrt{5}}{9}, \frac{1}{9}\right)$



$\sin t = \frac{1}{9}$

$\csc t = 9$

$\cos t = \frac{4\sqrt{5}}{9}$

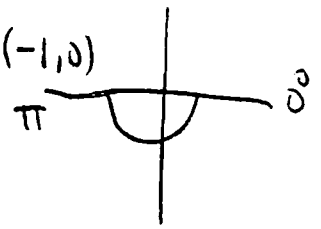
$\sec t = \frac{9}{4\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{9\sqrt{5}}{20}$

$\tan t = \frac{\frac{1}{9}}{\frac{4\sqrt{5}}{9}} = \frac{1}{9} \cdot \frac{9}{4\sqrt{5}}$

$= \frac{1}{4\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{5}}{20}$

$\cot t = 4\sqrt{5}$

10) $\cos(-\pi)$ $(-1,0)$



$= -1$

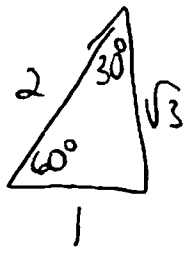
11) $\sin 0° + \cot 45°$

$(0) + (1) = 1$

12) $\sin\frac{\pi}{3} - \cos\frac{\pi}{6}$

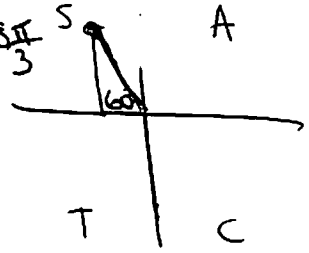
$= \sin 60° - \cos 30°$

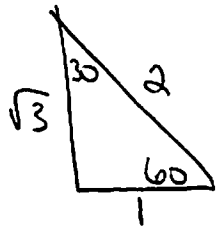
$= \frac{\sqrt{3}}{2} - \frac{\sqrt{3}}{2} = 0$



sohcahtoa

13) $\frac{8\pi}{3} = 480°$





sohcahtoa

$\sin\frac{8\pi}{3} = \frac{+\sqrt{3}}{2}$

$\csc\frac{8\pi}{3} = \frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$

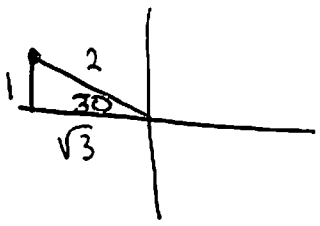
$\cos\frac{8\pi}{3} = \frac{-1}{2}$

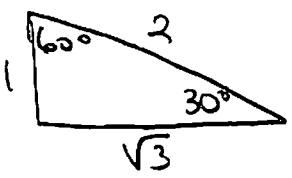
$\sec\frac{8\pi}{3} = -2$

$\tan\frac{8\pi}{3} = \frac{-\sqrt{3}}{1} = -\sqrt{3}$

$\cot\frac{8\pi}{3} = \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{-\sqrt{3}}{3}$

14) $510° = 360° + 150°$





$\sin 510° = \frac{+1}{2}$

$\cos 510° = \frac{-\sqrt{3}}{2}$

$\tan 510° = \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

$\csc 510° = 2$

$\sec 510° = \frac{-2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{-2\sqrt{3}}{3}$

$\cot 510° = \frac{-\sqrt{3}}{1} = -\sqrt{3}$

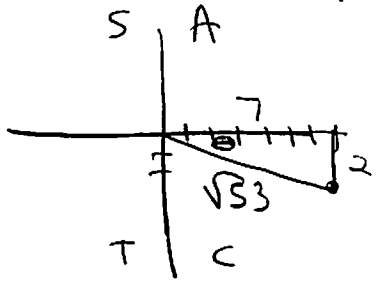
15) $\tan 14^\circ = .249$

make sure you are in degree mode!

16) $\sin 1 = .841$

1 radian NOT 1°!

17) $(7,-2)$



$x^2 = 7^2 + 2^2$

$x^2 = 49 + 4$

$x^2 = 53$

$x = \sqrt{53}$

$\sin\theta = \frac{2}{\sqrt{53}} \cdot \frac{\sqrt{53}}{\sqrt{53}} = \frac{-2\sqrt{53}}{53}$

$\csc\theta = \frac{-\sqrt{53}}{2}$

$\cos\theta = \frac{7}{\sqrt{53}} \cdot \frac{\sqrt{53}}{\sqrt{53}} = \frac{+7\sqrt{53}}{53}$

$\sec\theta = \frac{\sqrt{53}}{7}$

$\tan\theta = \frac{-2}{7}$

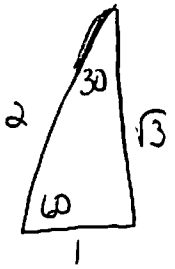
$\cot\theta = \frac{-7}{2}$

18) $\tan(390^\circ)$

$= \tan(360^\circ + 30^\circ)$

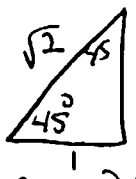
$= \tan(30^\circ)$

$= \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{+\sqrt{3}}{3}$



19) $\cos\left(\frac{25\pi}{4}\right) = \cos\left(\frac{24\pi}{4} + \frac{\pi}{4}\right)$

$= \cos\left(\frac{\pi}{4}\right) = \frac{\sqrt{2}}{2}$



Or $\frac{25\pi}{4} \cdot \frac{180^\circ}{\pi}$ (45°)

$= 1125^\circ - 360^\circ$

$= 765^\circ - 360^\circ$

$= 405^\circ - 360^\circ$

$= 45^\circ$

20) $\cos\theta > 0$, $\cos\theta < 0$

S	A
T	C

Quadrant IV

21) $\sin\theta = \frac{1}{16}$ $\cos\theta = \frac{\sqrt{255}}{16}$

$\csc\theta = \frac{1}{\sin\theta} = \frac{16}{1}$

$\sec\theta = \frac{1}{\cos\theta} = \frac{16}{\sqrt{255}} \cdot \frac{\sqrt{255}}{\sqrt{255}} = \frac{16\sqrt{255}}{255}$

$\tan\theta = \frac{\frac{1}{16}}{\frac{\sqrt{255}}{16}} = \frac{1}{16} \cdot \frac{16}{\sqrt{255}}$

$= \frac{1}{\sqrt{255}} \cdot \frac{\sqrt{255}}{\sqrt{255}} = \frac{\sqrt{255}}{255}$

$\cot\theta = \frac{\sqrt{255}}{1} = \sqrt{255}$

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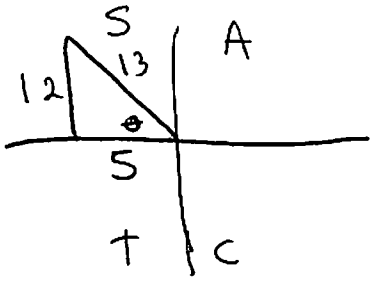
22) $\sin\theta = \frac{12}{13}$ $90° < \theta < 180°$



$13^2 = 12^2 + x^2$

$169 = 144 + x^2$

$x^2 = 25$

$x = 5$

$\cos\theta = \frac{-5}{13}$

$\tan\theta = \frac{-12}{5}$

$\cot\theta = \frac{-5}{12}$

$\sec\theta = \frac{-13}{5}$

$\csc\theta = \frac{13}{12}$

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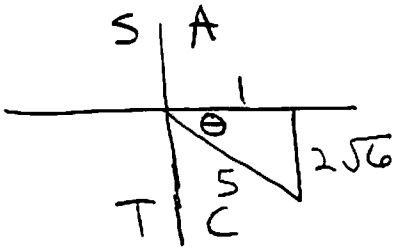
23) $\sec\theta = \frac{5}{1}$ $\sin\theta < 0$



$\sec\theta = \frac{5}{1}$

$\cos\theta = \frac{1}{5}$

$\sin\theta = \frac{-2\sqrt{6}}{5}$

$\tan\theta = -2\sqrt{6}$

$5^2 = 1^2 + x^2$

$25 = 1 + x^2$

$x^2 = 24$

$x = \sqrt{24} = 2\sqrt{6}$

$\cot\theta = \frac{1}{2\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}}$

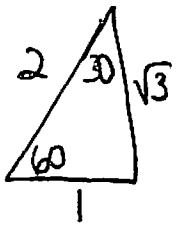
$= \frac{\sqrt{6}}{12}$

$\csc\theta = \frac{-5}{2\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}}$

$= \frac{-5\sqrt{6}}{12}$

24) $\cos\left(\frac{-\pi}{3}\right) = \cos\left(\frac{\pi}{3}\right)$ $\quad \cos(-\theta) = \cos(\theta)$

$\cos\left(\frac{\pi}{3}\right) = \cos 60^\circ = \frac{1}{2}$



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25) $\sin 26^\circ \cdot \csc 26^\circ$ $\quad \csc\theta = \frac{1}{\sin\theta}$

$= \frac{\sin 26^\circ}{1} \cdot \frac{1}{\sin 26^\circ} = 1$

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26) domain of csc?

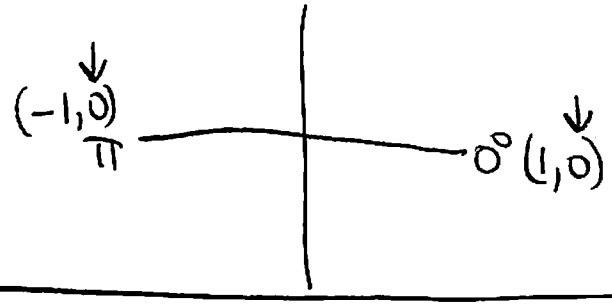
domain = all reals except multiples of π

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

we don't want $\sin\theta = 0$!

where does ~~this~~ happen?

choice A



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27) range of sec?

choice C

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

range of $\cos\theta$ = $-1 \le y \le 1$

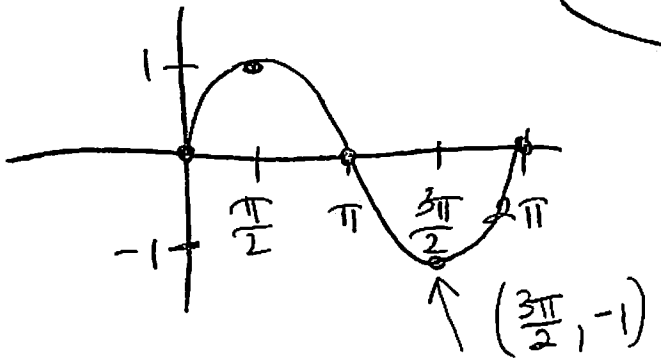
so all real number $(-\infty, -1] \cup [1, \infty)$

28) where does $\sin x = -1$?

from $0 \le x \le 2\pi$

look at graph

$x = \frac{3\pi}{2}$



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29) $y = a\cos(bx+c)+d$

amplitude $= |a|$

$y = -3\cos(4x)$

$|a| = |-3| = 3$

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

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

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30) $y = a\sin(bx+c)+d$

$y = -\frac{5}{7}\sin(\frac{9}{7}x)$

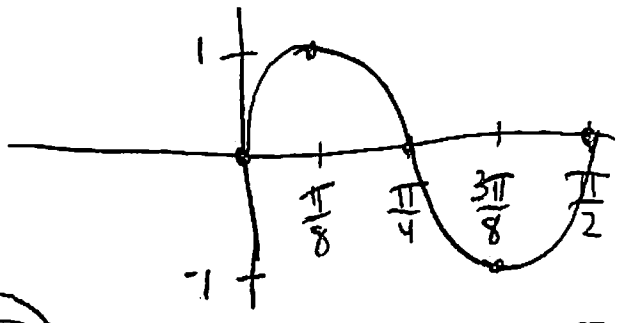
$|a| = |-\frac{5}{7}| = \frac{5}{7}$

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

$= \frac{2\pi}{9/7} = \frac{2\pi}{1} \cdot \frac{7}{9}$

$= \frac{14\pi}{9}$

31) $y = \sin(4x)$



$A = |a| = 1$

$P = \frac{2\pi}{b} = \frac{2\pi}{4} = \frac{\pi}{2}$

choice C

$T = \frac{\text{period}}{4} = \frac{\frac{\pi}{2}}{\frac{4}{1}} = \frac{\pi}{2} \cdot \frac{1}{4} = \frac{\pi}{8}$

E = endpoints

$bx - c = 0$ $\quad bx - c = 2\pi$

$4x = 0$ $\quad 4x = 2\pi$

$x = 0$ $\quad x = \frac{\pi}{2}$

V = vertical shift

none

1) 0

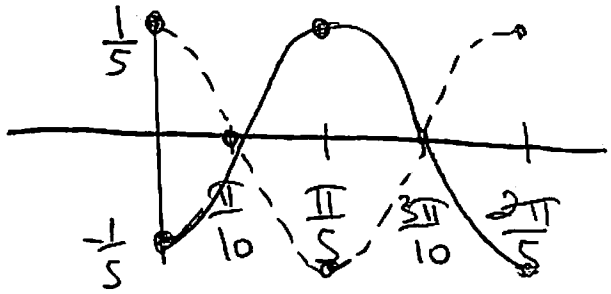
2) $0 + \frac{\pi}{8} = \frac{\pi}{8}$

3) $\frac{\pi}{8} + \frac{\pi}{8} = \frac{2\pi}{8}$ or $\frac{\pi}{4}$

4) $\frac{\pi}{4} + \frac{\pi}{8} = \frac{3\pi}{8}$

5) $\frac{3\pi}{8} + \frac{\pi}{8} = \frac{4\pi}{8}$ or $\frac{\pi}{2}$

32) $y = -\frac{1}{5}\cos(5x)$



$A = |a| = \left|-\frac{1}{5}\right| = \frac{1}{5}$

choice A

$P = \frac{2\pi}{b} = \frac{2\pi}{5}$

$T = \frac{\text{period}}{4} = \frac{\frac{2\pi}{5}}{4} = \frac{2\pi}{5} \cdot \frac{1}{4} = \frac{\pi}{10}$

e = endpoint

$bx - c = 0$

$5x = 0$

$x = 0$

$bx - c = 2\pi$

$5x = 2\pi$

$x = \frac{2\pi}{5}$

V = vertical shift

none

1) 0

2) $0 + \frac{\pi}{10} = \frac{\pi}{10}$

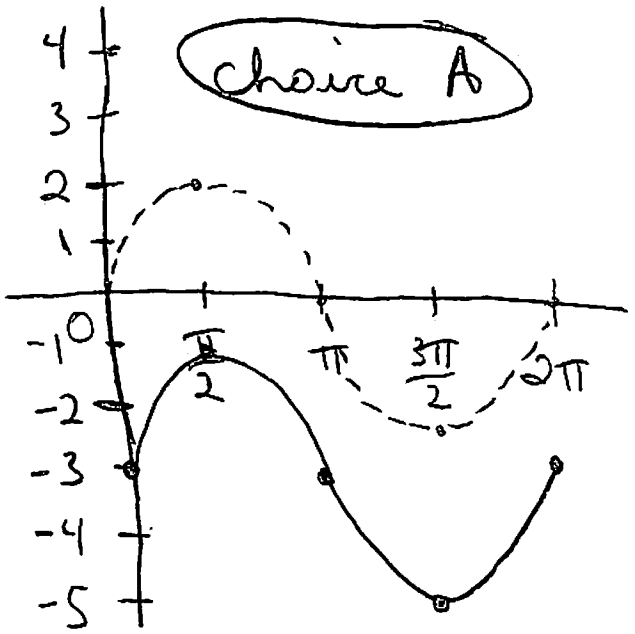
3) $\frac{\pi}{10} + \frac{\pi}{10} = \frac{2\pi}{10} = \frac{\pi}{5}$

4) $\frac{\pi}{5} + \frac{\pi}{10} = \frac{3\pi}{10}$

5) $\frac{3\pi}{10} + \frac{\pi}{10} = \frac{2\pi}{5}$

33) $y = 2\sin(x) - 3$

$y = a\sin(bx - c) + d$



Choice A

$A = |a| = |2| = 2$

$P = \frac{2\pi}{b} = \frac{2\pi}{1} = 2\pi$

$T = \frac{\text{period}}{4} = \frac{2\pi}{4} = \frac{\pi}{2}$

e = endpoint

$bx - c = 0$ $\quad$ $bx - c = 2\pi$

$x = 0$ $\quad$ $x = 2\pi$

V = vertical shift

= 3

1) 0

2) $0 + \frac{\pi}{2} = \frac{\pi}{2}$

3) $\frac{\pi}{2} + \frac{\pi}{2} = \pi$

4) $\pi + \frac{\pi}{2} = \frac{3\pi}{2}$

5) $\frac{3\pi}{2} + \frac{\pi}{2} = 2\pi$