Math 101 — Quiz 2
TUTOR HELP NOT OKAY!!

Name: Key

Directions: **Due Wednesday, Feb. 4th**

- You are not to work on this together or get help from mentors/tutors!!
- Show all work.
- Write your solutions on printer paper.
- Only use a calculator if the question specifically says to use one!
- Box off your solutions.
- No credit will be given for sloppy or illegible work.
- Do not write your solutions on this piece of paper.
- Staple your worked out solutions to this piece of paper and use this piece of paper as your top (or cover) sheet.

Exercises

1. **Section 2.3**

   Do problems 20, 26, 30, 44, 54, 61, 78 on pages 136–137 in the textbook.

2. **Section 2.4**

   Do problems 36, 40, 44, 48, 52, 62, 64, 66 on pages 150–151 in the textbook.

Quiz 2 Solns

(20) $\sin\left(\frac{9\pi}{4}\right) = \sin\left(\frac{\pi}{4} + \frac{8\pi}{4}\right)$

$= \sin\left(\frac{\pi}{4} + 2\pi\right)$

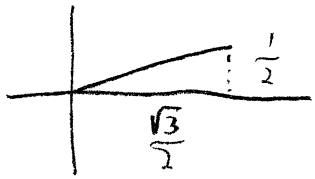
$= \sin\left(\frac{\pi}{4}\right) = \boxed{\frac{\sqrt{2}}{2}}$

(26) $\sec\left(\frac{25\pi}{6}\right) = \sec\left(\frac{\pi}{6} + \frac{12\pi}{6} + \frac{12\pi}{6}\right)$

$= \sec\left(\frac{\pi}{6} + 2\pi + 2\pi\right)$

$= \sec\left(\frac{\pi}{6} + 2 \cdot 2\pi\right)$

$= \sec\left(\frac{\pi}{6}\right) = \frac{2}{\sqrt{3}} = \frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \boxed{\frac{2\sqrt{3}}{3}}$



(30) Given $\cos\theta > 0$ and $\tan\theta > 0$

S	A
T	C

$[\cos\theta > 0] \Rightarrow [\theta$ terminates in either Q1 or Q4$]$

But then $[\tan\theta > 0] \Rightarrow [\theta$ terminates in Q1$]$
(since tangent is positive in Q1 and Q4)

(44) $\cos\theta = \frac{3}{5}$, θ in Q4

Then $\sec\theta = \frac{5}{3}$. Also, $\cos^2\theta + \sin^2\theta = 1$, or $\left(\frac{3}{5}\right)^2 + \sin^2\theta = 1$, or $\sin^2\theta = 1 - \frac{9}{25}$, or $\sin^2\theta = \frac{16}{25}$

or $\sin\theta = \pm\sqrt{\frac{16}{25}} = \pm\frac{4}{5}$. But $\sin\theta < 0$ since θ is in Q4. So, $\sin\theta = -\frac{4}{5}$.

Then $\csc\theta = -\frac{5}{4}$. Moreover, $\tan\theta = \frac{\sin\theta}{\cos\theta} = \frac{-4/5}{3/5} = -\frac{4}{5} \cdot \frac{5}{3} = -\frac{4}{3}$.

Then $\cot\theta = -\frac{3}{4}$

$\cos\theta = \frac{3}{5}$	$\sin\theta = \frac{-4}{5}$
$\sec\theta = \frac{5}{3}$	$\csc\theta = \frac{-5}{4}$
$\tan\theta = \frac{-4}{3}$	$\cot\theta = \frac{-3}{4}$

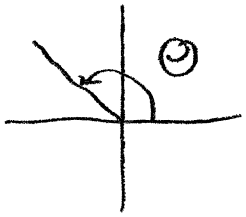
(54) Given $\csc\theta = 3$, $\cot\theta < 0$

$[\csc\theta > 0] \Rightarrow [\theta$ terminates in Q1 or Q2$]$

But $[\cot\theta < 0] \Rightarrow [\theta$ terminates in Q2$]$

(since $\cot\theta < 0$ if θ is in Q2 or Q4)

$x<0$, $y>0$	$x>0$, $y>0$
$x<0$, $y<0$	$x>0$, $y<0$



If $\csc(\theta) = 3$, then $\sin\theta = \frac{1}{3}$. Also,

$\sin^2\theta + \cos^2\theta = 1$, or $\left(\frac{1}{3}\right)^2 + \cos^2\theta = 1$, or

$\cos^2\theta = 1 - \frac{1}{9}$, or $\cos^2\theta = \frac{8}{9}$, or $\cos\theta = \pm\sqrt{\frac{8}{9}}$

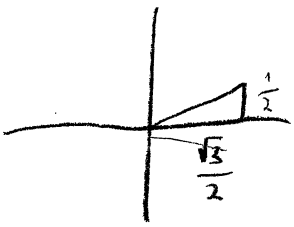
$[$But θ in Q2$] \Rightarrow \left[\cos\theta = -\sqrt{\frac{8}{9}} = \frac{-\sqrt{8}}{\sqrt{9}} = \frac{-2\sqrt{2}}{3}\right]$. Then

$\sec\theta = -\frac{3}{2\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = -\frac{3\sqrt{2}}{4}$, and $\tan\theta = \frac{\sin\theta}{\cos\theta} = \frac{\frac{1}{3}}{\frac{-2\sqrt{2}}{3}} = \frac{1}{3} \cdot \frac{3}{-2\sqrt{2}}$

$= -\frac{1}{2\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = -\frac{\sqrt{2}}{4}$ also $\cot(\theta) = -2\sqrt{2}$

$\cos\theta = \frac{-2\sqrt{2}}{3}$	$\sin\theta = \frac{1}{3}$
$\sec\theta = \frac{-3\sqrt{2}}{4}$	$\csc\theta = 3$
$\tan\theta = -\frac{\sqrt{2}}{4}$	$\cot\theta = -2\sqrt{2}$

(61) $\tan(-30^\circ) = -\tan(30^\circ)$



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

$$= -\frac{1}{\sqrt{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}} = \boxed{-\frac{\sqrt{3}}{3}}$$

(78) Pythagorean Identities

$$1 + \tan^2\theta = \sec^2\theta$$
$$-\tan^2\theta \quad -\tan^2\theta$$

$$1 = \tan^2(\theta) - \sec^2(\theta)$$

2.4

$$\boxed{1} = \tan^2(18^\circ) - \sec^2(18^\circ)$$

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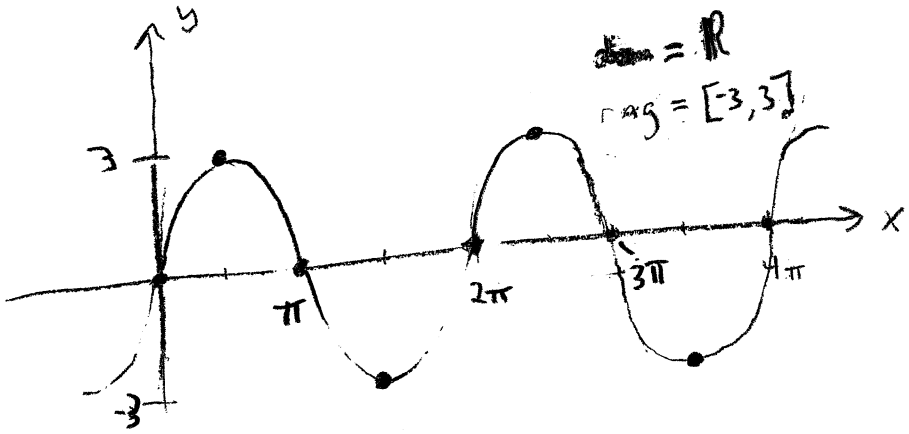
(36) $y = 3\sin(x)$

$A = 3$

$pd = 2\pi$

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



dom = ℝ

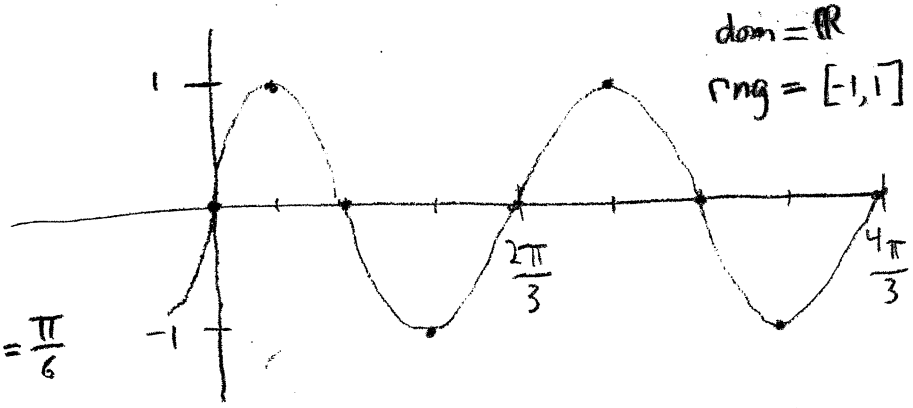
rng = [-3, 3]

(40) $y = \sin(3x)$

$A = 1$

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

$qp = \frac{\frac{2\pi}{3}}{4} = \frac{2\pi}{3}\cdot\frac{1}{4} = \frac{\pi}{6}$



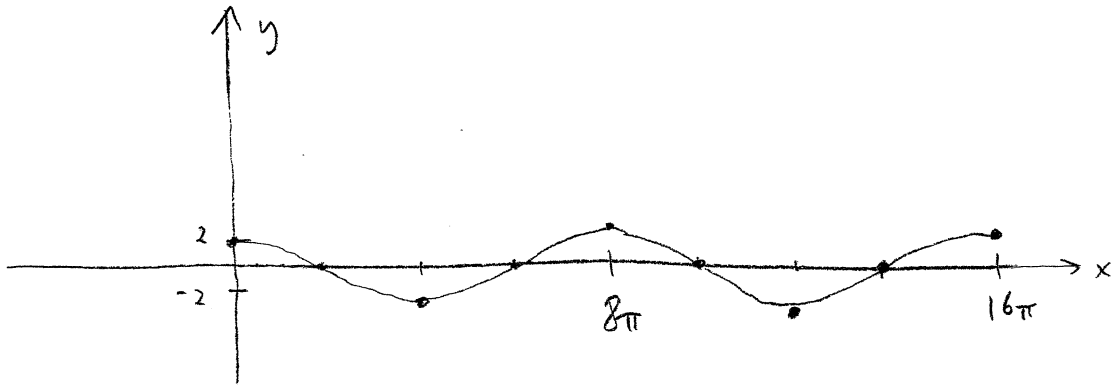
dom = ℝ

rng = [-1, 1]

(44) $y = 2\cos\left(\frac{1}{4}x\right)$

$A = 2$

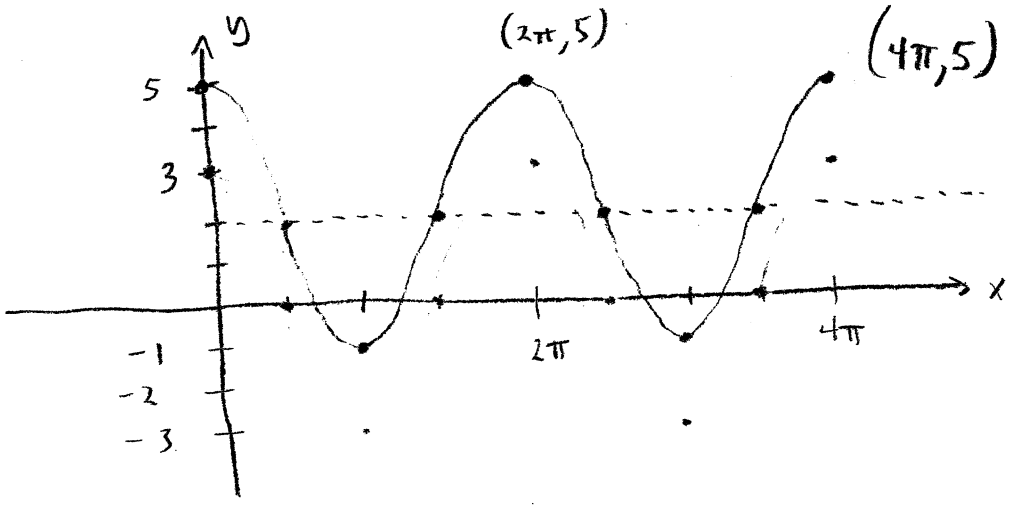
$Pd = \frac{2\pi}{\omega} = \frac{2\pi}{\frac{1}{4}} = \frac{2\pi}{1} \cdot \frac{4}{1} = 8\pi$



(48) $y = 3\cos(x) + 2$

$A = 3$

$pd = 2\pi$



$dom = \mathbb{R}$

$rng = [-1, 5]$

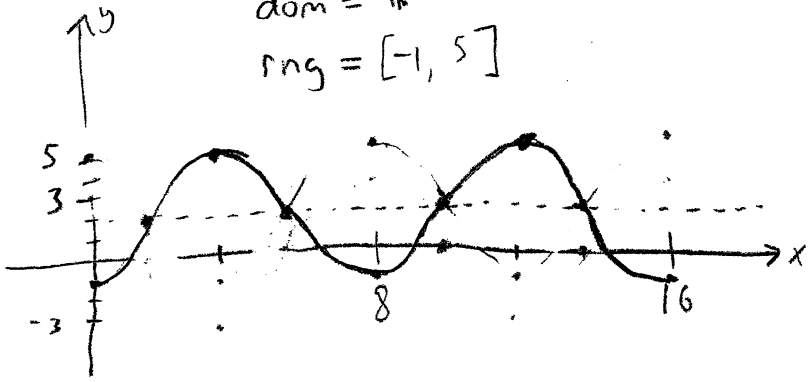
(52) $y = -3\cos\left(\frac{\pi}{4}x\right) + 2$

$A = -3$ so use the reflection of the cosine graph around the x-axis

$pd = \frac{2\pi}{\frac{\pi}{4}} = \frac{2\pi}{1} \cdot \frac{4}{\pi} = 8$

$dom = \mathbb{R}$

$rng = [-1, 5]$



(62) $pd = 1$ so $\frac{2\pi}{\omega} = 1 \Rightarrow \omega = 2\pi \Rightarrow$ $y = 4\sin(2\pi x)$

(64) $A = 4$

$pd = 8\pi$, so $8\pi = \frac{2\pi}{\omega} \Rightarrow \omega = \frac{2\pi}{8\pi} = \frac{1}{4} \Rightarrow$ $y = 4\sin\left(\frac{1}{4}x\right)$

(66) $A = -2$, $pd = 4$, so $4 = \frac{2\pi}{\omega} \Rightarrow \omega = \frac{\pi}{2}$ $y = -2\sin\left(\frac{\pi}{2}x\right)$