Math 101 — Quiz 1 **Name:** _____
TUTOR HELP NOT OKAY!!

Directions: **Due Tuesday, Jan. 27th**

- 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

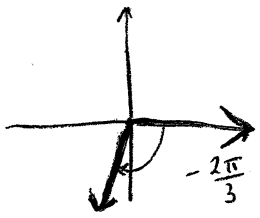
1. **Section 2.1**

   Do problems 20, 28, 30, 42, 54, 92, 94, & 108 on pages 105–106 in the textbook.

2. **Section 2.2**

   Do problems 14, 22, 36, 52, 56, 66, 70, 78, 96 on pages 121–122 in the textbook.

(20)



(28) $98^\circ 22' 45'' = 98^\circ + (22)\cdot(1') + (45)\cdot(1'')$

$= 98^\circ + 22\left(\frac{1}{60}\right)^\circ + 45\cdot\left(\frac{1}{3600}\right)^\circ$

$= \boxed{98.38^\circ}$

(30) $61.24^\circ = 61^\circ + 0.24\cdot(1^\circ)$

$= 61^\circ + 0.24\cdot(60')$

$= 61^\circ + 14.4'$

$= 61^\circ + 14' + 0.4(1')$

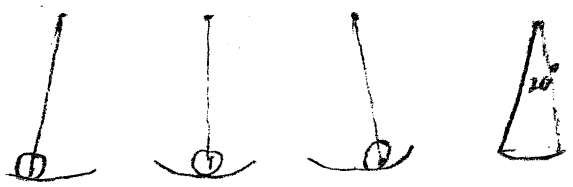
$= 61^\circ + 14' + 0.4(60'')$

$= \boxed{61^\circ\ 14'\ 24''}$

(42) $270^\circ \cdot \frac{\pi}{180^\circ} = \boxed{\frac{3\pi}{2}}$

(54) $\frac{5\pi}{12} \cdot \frac{180^\circ}{\pi} = \boxed{75^\circ}$

(92)



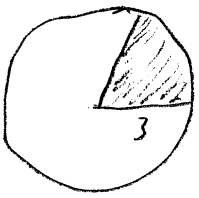
$r = 40$ in

$s = r\theta = (40\text{ in})(20^\circ)\cdot\frac{\pi}{180^\circ}$

$= \frac{40\pi}{9}\text{ in} \doteq \boxed{13.96\text{ in}}$

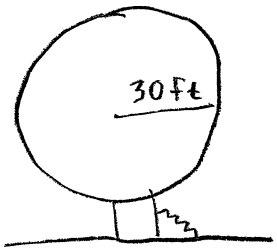
(44) $r = 3$ cm

$\theta = 60°$



$$A = \frac{1}{2} r^2 \theta = \frac{1}{2} \cdot (3\text{cm})^2 \cdot (60°) \cdot \left(\frac{\pi}{180°}\right) = \frac{3\pi}{2} \text{ cm}^2 \doteq \boxed{4.71 \text{ cm}^2}$$

(108)



Given ω = angular speed = $\frac{1 \text{ rev}}{70 \text{ sec}}$.

Find ω and v.

$$\omega = \frac{1 \text{ rev}}{70 \text{ sec}} \cdot \frac{2\pi}{1 \text{ rev}} = \boxed{\frac{\pi}{35} \text{ rad/sec}} \quad (\approx 0.8976)$$

$$v = r\omega = (30 \text{ ft})\left(\frac{2\pi}{70} \text{ rad/sec}\right) = \boxed{\frac{6\pi}{7} \text{ ft/sec}} \approx 2.69 \text{ ft/sec}$$

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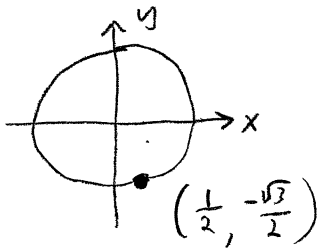
(14)



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

$$\tan\theta = \frac{y}{x} = \frac{-\frac{\sqrt{3}}{2}}{\frac{1}{2}} = -\frac{\sqrt{3}}{2} \cdot \frac{2}{1} = -\frac{\sqrt{3}}{1} = -\sqrt{3}$$

$$\sec(\theta) = \frac{1}{x} = \frac{1}{\frac{1}{2}} = 1 \cdot \frac{2}{1} = 2$$

$$\csc(\theta) = \frac{1}{y} = \frac{1}{-\frac{\sqrt{3}}{2}} = 1 \cdot \frac{-2}{\sqrt{3}} = \frac{-2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = -\frac{2\sqrt{3}}{3}$$

$$\cot\theta = \frac{x}{y} = \frac{\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = \frac{1}{2} \cdot \frac{-2}{\sqrt{3}} = \frac{-1}{\sqrt{3}} = \frac{-1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{-\sqrt{3}}{3}$$

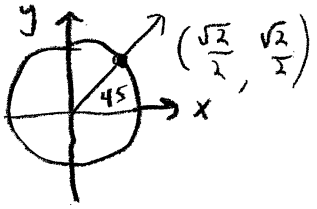
(22) $\cos(7\pi) = \boxed{-1}$

$7\pi = 2\pi + 2\pi + 2\pi + 1\pi$

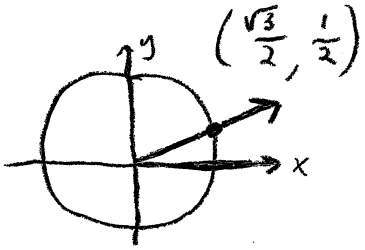
$= 1\text{rev} + 1\text{rev} + 1\text{rev} + \frac{1}{2}\text{ rev}$

$= 3\frac{1}{2}$ revolutions

(36) $\tan 45^\circ \cos 30^\circ = (\tan 45^\circ) \cdot (\cos 30^\circ)$



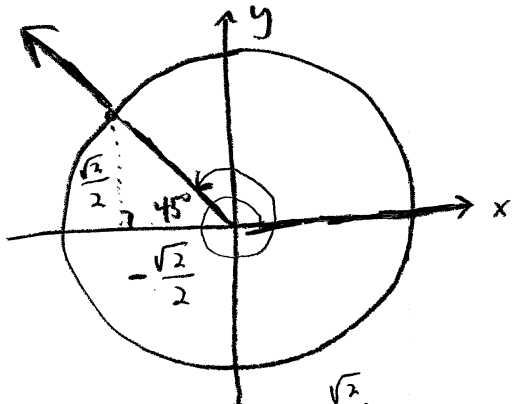
$= \left(\frac{\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}}\right) \cdot \left(\frac{\sqrt{3}}{2}\right)$



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

$= \boxed{\frac{\sqrt{3}}{2}}$

(52) $\theta = \frac{11\pi}{4}$; $P(x,y) = \left(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$



$\cos\theta = -\frac{\sqrt{2}}{2}$ $\quad \sec\theta = -\sqrt{2}$

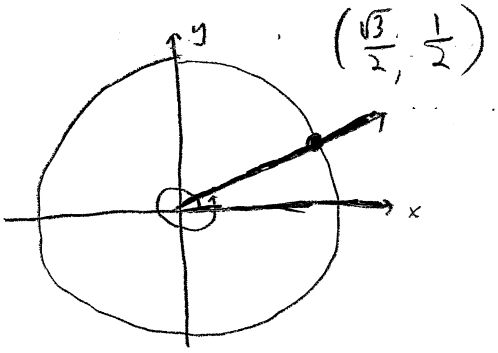
$\sin\theta = \frac{\sqrt{2}}{2}$ $\quad \csc\theta = \sqrt{2}$

$\tan\theta = -1$ $\quad \cot\theta = -1$

$\tan\theta = \frac{y}{x} = \frac{\frac{\sqrt{2}}{2}}{-\frac{\sqrt{2}}{2}} = -1$, $\cot\theta = \frac{x}{y} = \frac{-\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} = -1$

$\sec\theta = \frac{1}{x} = \frac{1}{-\frac{\sqrt{2}}{2}} = 1 \cdot \frac{-2}{\sqrt{2}} = -\frac{2}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = -\frac{2\sqrt{2}}{2} = -\sqrt{2}$

(56) $\theta = 390^\circ$



$\cos\theta = \frac{\sqrt{3}}{2}$ $\quad \sec\theta = \frac{2\sqrt{3}}{3}$

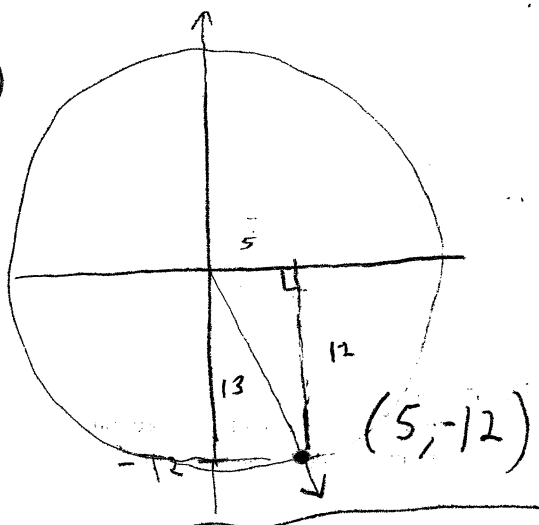
$\sin\theta = \frac{1}{2}$ $\quad \csc\theta = 2$

$\tan\theta = \frac{\sqrt{3}}{3}$ $\quad \cot\theta = \sqrt{3}$

(66) $\cos(14^\circ) \doteq \boxed{0.97}$

(70) $\sin\left(\frac{\pi}{8}\right) \doteq \boxed{0.38}$

(78)



The terminal point is on a circle of radius 13; since

$r^2 = 5^2 + (-12)^2$

$= 25 + 144$

$= 169$, or $r^2 = 169$, or $r = 13$.

Then,

$\cos\theta = \frac{x}{r} = \frac{5}{13}$ $\quad \sec\theta = \frac{r}{x} = \frac{13}{5}$

$\sin\theta = \frac{y}{r} = \frac{-12}{13}$ $\quad \csc\theta = \frac{r}{y} = \frac{13}{-12}$

$\tan\theta = \frac{y}{x} = \frac{-12}{5}$ $\quad \cot\theta = \frac{x}{y} = -\frac{5}{12}$

(96) $g(\theta) = g(60^\circ) = \cos(60^\circ)$

$= \boxed{\frac{1}{2}}$