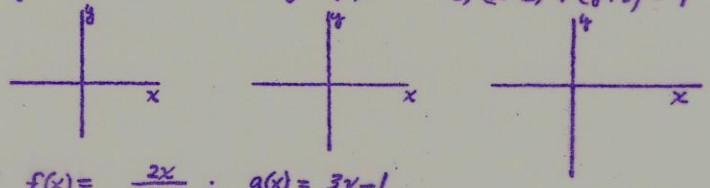
TRIGONOMETRY EXAM 1 UCF NAME _____

Show all work as necessary on this test or on separate paper. Turn in work sheets.
Sorry, NO CALCULATORS or FORMULA SHEETS. Table II will be required.

1. Find the distance between $A(-2,5)$ and $B(4,6)$.
2. Given $A(-4,-3)$ and $B(6,1)$ find:
   a) The midpoint of segment $\overline{AB}$.
   b) The equation of the perpendicular bisector of $\overline{AB}$.
3. Sketch the graph:
   a) $y = -2x + 3$ b) $y = \sqrt{-x}$ c) $(x-2)^2 + (y+3)^2 = 9$



4. If $f(x) = \frac{2x}{x^2+1}$; $g(x) = 3x - 1$
   a) $f(-3) =$ b) $f\left(\frac{2}{x}\right) =$ (Simplify!) c) $\frac{g(x+h)-g(x)}{h}$ d) $g[f(x)] =$ (Simplify.)
5. Give the rectangular coordinates of the points
   a) $P\left(\frac{2\pi}{3}\right)$ b) $P\left(\frac{7\pi}{4}\right)$
6. If $\sin t = -\frac{3}{5}$ and $\cos t = \frac{4}{5}$, find
   a) $\sec t$ b) $\tan t$
7. Determine the quadrant if:
   a) $\tan t < 0$ and $\cos t > 0$.
   b) $\csc t < 0$ and $\cot t > 0$.
8. Given $\tan t = -\frac{3}{4}$ and $\sin t > 0$. Find $\sec t$.
9. Given $\csc t = 5$ and $\cot t < 0$. Find $\cos t$.
10. Express in degrees:
    a) $\frac{2\pi}{3}^R$ b) $\frac{\pi}{9}^R$
11. Express in radians:
    a) 100° b) $1'$

1c _____
2a) _____
b) _____
4a) _____
b) _____
c) _____
d) _____
5a) _____
b) _____
6a) _____
b) _____
7a) _____
b) _____
8. _____
9. _____
10a) _____
b) _____
11a) _____
b) _____

NAME

12. Find the length of an arc of a circle of radius 6 cm. with central angle 50°.

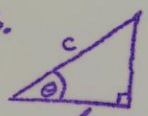
13. Two points A and B are separated on the earths surface by 200 miles. Find the measure of ∠ACB where C is the center of the earth, where the diameter of the earth is approximately 8000 miles.

14. For θ in standard position and passing through P(−2, −5)
a) Find tan θ b) Find cos θ c) Find csc θ.

15.

a) Find sin θ
b) Find cos θ

16.



a) Find sec θ.
b) Find tan θ

Use Table II of your text, (Interpolate as necessary.) or where possible use special values. SHOW ALL WORK!!

17. If γ = 90°, α = 52°, a = 20 find β, b, and c.

18. If γ = 90°, a = 48, b = 30 find α, β, c.

19. The angle of depression from the top of a cliff to a ship at sea is 38° 50'. If the cliff is 100 m. high, how far is the ship from the base of the cliff.

20. A regular pentagon is inscribed in a circle of radius 30 cm. Find the perimeter of the pentagon.

In 21–24, graph $0 \le x \le 2\pi$, give period of each.

21. Graph $y = 3 \sin 2x$
22. Graph $y = 2 \cos(x + \frac{\pi}{4})$
23. Graph $y = -2 \sec x$
24. Graph $y = \tan 2x$

12.
13.
14a)
b)
c)
15a)
b)
16a)
b)
17. β =
b =
c =
18. α =
β =
c =
(4 points) 19.
20.
21. Period =
22. Period =
23. Period =
24. Period =
(Graph on separate paper)

TRIG EXAM 1 UCF Solutions K. Kapalje

1. $A(-2,5)$ $B(4,6)$

$d = \sqrt{6^2+1^2} = \sqrt{37}$

2. $A(-4,-3)$ $B(6,1)$

a) Mid $(1,-1)$

b) $m = \frac{y_2-y_1}{x_2-x_1} = \frac{-3-1}{-4-6} = \frac{2}{5}$

$m_\perp = -\frac{5}{2}$

$y+1 = -\frac{5}{2}(x-1)$

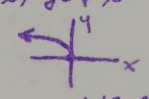
$y = -\frac{5}{2}x + \frac{3}{2}$

or $5x+2y=3$

3a) $y = -2x+3$

Line $m=-2$, y int $= 3$.

b) $y = \sqrt{-x}$

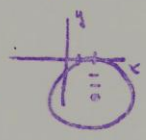


Upper half of $x = -y^2$

c) $(x-2)^2 + (y+3)^2 = 9$

Circle

Center $(2,-3)$ $r=3$



4a) $f(x) = \frac{2x}{x^2+1}$

$f(-3) = \frac{-6}{10} = -\frac{3}{5}$

b) $f\left(\frac{2}{x}\right) = \frac{2\cdot\frac{2}{x}}{\left(\frac{2}{x}\right)^2+1} = \frac{\frac{4}{x}}{\left(\frac{4}{x^2}+1\right)} \frac{x^2}{x^2}$

$= \frac{4x}{4+x^2}$

c) $g(x) = 3x-1$ $\quad g(x+h) = 3(x+h)-1$

$\frac{g(x+h)-g(x)}{h} = \frac{3x+3h-1-(3x-1)}{h}$

$= 3$

d) $g[f(x)] = 3\left[\frac{2x}{x^2+1}\right] - 1 = \frac{6x-x^2-1}{x^2+1}$

5a) $P\left(\frac{8\pi}{3}\right) = P\left(2\pi+\frac{2\pi}{3}\right)$

$\left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$

b) $P\left(\frac{7\pi}{4}\right)$

$\left(\frac{1}{\sqrt{2}}, -\frac{1}{\sqrt{2}}\right)$

6. $\sin t = -\frac{3}{5}$ $\quad \cos t = \frac{4}{5}$

a) $\sec t = \frac{1}{\cos t} = \frac{5}{4}$ b) $\tan t = \frac{\sin t}{\cos t} = -\frac{3}{4}$

7a) $\tan t < 0$ and $\cot t > 0$

QII, IV $\quad$ QI, III

QIV

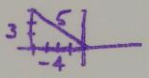
b) $\csc t < 0$ and $\cot t > 0$

QIII, IV $\quad$ QI, III

QIII

8. $\tan t = -\frac{3}{4}$ $\sin t > 0$

QII.



$\sec t = -\frac{5}{4}$

9. $\csc t = 5$ $\cot t < 0$

QII so $\cos t < 0$

$\sin t = \frac{1}{5}$

$\cos t = \pm\sqrt{1-\sin^2 t}$

$= -\sqrt{1-\frac{1}{25}}$

$= -\sqrt{\frac{24}{25}} = -\frac{2\sqrt{6}}{5}$

10a) $\frac{2\pi}{3}\ R \cdot \frac{180^\circ}{\pi R} = 120^\circ$

b) $\frac{\pi}{9}\ R \cdot \frac{180^\circ}{\pi R} = 20^\circ$

11a) $100^\circ \cdot \frac{\pi R}{180} = \frac{5\pi R}{9}$

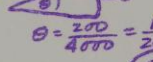
b) $1' = \frac{1}{60}^\circ \cdot \frac{\pi}{180} = \frac{\pi}{10800} R$

12. $r = 6$ cm. $\theta = 50^\circ \cdot \frac{\pi}{180}$

$s = r\theta$

$= 6\text{cm} \cdot \frac{5\pi}{18} R = \frac{5\pi}{3}$ cm.

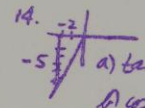
13.



$\theta = \frac{200}{4000} = \frac{1}{20} R \cdot \frac{180^\circ}{\pi R}$

$= \frac{9^\circ}{\pi}$

14.



a) $\tan\theta = \frac{5}{2}$

b) $\cos\theta = -\frac{2}{\sqrt{29}}$

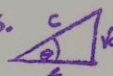
c) $\csc\theta = \frac{\sqrt{29}}{5}$

15.

a) $\sin\theta = \frac{\sqrt{21}}{5}$

b) $\cos\theta = \frac{2}{5}$

16.

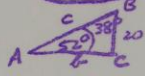


a) $\sec\theta = \frac{c}{a}$

b) $\tan\theta = \frac{\sqrt{c^2-a^2}}{a}$

17. $\alpha = 52^\circ$, $\gamma = 90^\circ$, $a = 20$

$\beta = 38^\circ$



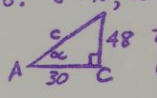
$\tan 38^\circ = \frac{b}{20}$

$b = 20\tan 38^\circ = 15.63$

$\sec 38^\circ = \frac{c}{20}$

$c = 20\sec 38^\circ = 25.38$

18. $\gamma = 90^\circ$, $a = 48$, $b = 30$



$\tan\alpha = \frac{48}{30} = 1.600$

$\alpha = 58^\circ$

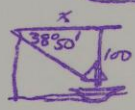
$\beta = 90-58^\circ = 32^\circ$

$\sec\alpha = \frac{c}{30}$

$c = (\sec\alpha)30$

$= 56.61$

19.

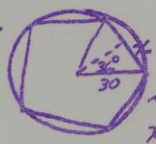


$\cot 38^\circ 50' = \frac{x}{100}$

$x = 100(1.242$

$= 124.2$m

20.



$\frac{360^\circ}{10} = 36^\circ$

$\sin 36^\circ = \frac{x}{30}$

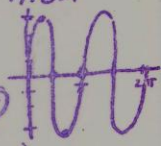
$x = 30\sin 36^\circ$

$= 17.634$

$P = 176.34$ cm.

21. $y = 3\sin 2x$

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

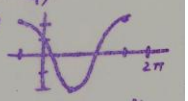


22. $y = 2\cos(x+\pi/4)$

Period $= 2\pi$

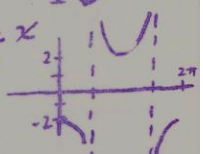
P.S. $\frac{\pi}{4}$ L.

Amp 2



23. $y = -2\sec x$

Per. $= 2\pi$



24. $y = \tan 2x$

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