Name: Key 12/15/2017 Trig – Semester Test

1) Simplify the following expressions and write it with positive exponents:

(6) a) $x^4y^2(4x^2y^{-8})$ $4x^6/y^6$ | b) $\frac{(x^{-2}y^3)^3}{x^5y^{-4}}$ y^{13}/x^{11}

(2) 2) State the domain and range of the following relation AND state whether or not it is a function.

a) $\{(2,-1),(-3,4),(5,4),(2,-2)\}$ D: $\{-3,2,5\}$ R: $\{-2,-1,4\}$ not function.

(2) 3) Given the function: $f(x) = 2x - 5$, find its inverse.

$+5$ $\div 2$ $\frac{x+5}{2} = y$.

(4) 4) Solve the following inequalities and write your answers in interval notation.

a) $2x + 1 \le 9$ -1 -1 $2x \le 8$ $x \le 4$ $(-\infty, 4]$ | b) $4x + 5 \ge 8x - 9$ $14 \ge 4x$ $x \le 3.5$ $(-\infty, 3.5]$

5) Determine if the following functions are inverses of each other.

(3) inverse $g(x) = \frac{-10+x}{3}$; $f(x) = 3x + 10$ $3\left(\frac{-10+x}{3}\right) + 10 = -10 + x + 10$ $= x$ ✓

(6) 6) Simplify the following radicals

a) $\sqrt[3]{27x^9y^8}$ $3 \cdot 3 \cdot 3$ $3x^3y^2\sqrt[3]{y^2}$ | b) $(ab^3a^6b^7)^{\frac{1}{3}}$ $\sqrt[3]{a^7b^{10}} = a^2b^3\sqrt[3]{ab}$

(6) 7) Use the formula $s = r\theta$ to find the missing variable in the following problems.

a) $s = 4ft, r = 2ft$ $4 = 2\theta$ $\theta = 2$ | b) $s = 6ft, \theta = \frac{\pi}{4}$ $6 = r \cdot \frac{\pi}{4}$ $r = 7.64ft$ | c) $r = 8m, \theta = 60° = \frac{\pi}{3}$ $s = 8 \cdot \frac{\pi}{3}$ $s = 8.37m$

(8) 8) Find the distance between the following points AND the midpoints. Write your answers in the simplest radical form.

a) $(-1,-2)$ & $(5,-7)$ $M\left(2, -\frac{9}{2}\right)$ $d = \sqrt{(5-1)^2 + (-7+2)^2}$ $d = \sqrt{61}$ | b) $(1,4)$ & $(6,-8)$ $M\left(\frac{7}{2}, -2\right)$ $d = \sqrt{(6-1)^2 + (-8-4)^2}$ $= \sqrt{25 + 144}$ $= \sqrt{13}$

9) Using the triangle on the right and the values given, fill in the following chart.

(4)

Trig Function	a) $a = 2, c = 3$	b) $a = 4, b = 3$
$\sin\theta$	$2/3$	$4/5$
$\cos\theta$	$\sqrt{5}/3$	$3/5$
$\sec\theta$	$3\sqrt{5}/5$	$5/4$ $5/3$
$\cot\theta$	$\sqrt{5}/2$	$3/4$

(3) 10) Use completing the square method to put the equation of a circle in standard form.

$(3,6)$ $r = 8$ $x^2 - 6x + y^2 + 12y - 16 = 3$ $x^2 - 6x + 9 + y^2 + 12y + 36 = 16 + 9 + 36$ $(x-3)^2 + (y+6)^2 = 64$

(3) 11) What is the average rate of change going from $f(3)$ to $f(x)$ of the function:

$f(x) = 4x + 2$ $f(3) = 14$ $\frac{f(x) - f(3)}{x - 3}$ $\frac{4x+2-14}{x-3}$ $\frac{4x-12}{x-3} = \frac{4(x-3)}{(x-3)}$

12) A wheel is turning 30 revolutions per minute. If the radius is $4in$, what is the linear speed of the wheel?

(3) $\frac{30 rev}{min} \left| \frac{2\pi rad}{1 rev} \right. = 60\pi$ $v = \omega r$ $= 60\pi \cdot 4$ $= 240\pi in/min.$

13) Given the following sets of points and graph, 1) Is it a function? 2) Find the inverse., 3) Is the inverse a function? (3)

$\{(-1,2),(2,3),(-1,-9),(0,6)\}$ no

$\{(2,-1),(3,2),(-9,-1),(6,0)\}$ Yes

14) Convert the following from seconds and minutes to decimals. (4)

a) 19°6′18″ /60 19.105

b) 25°1′59″ 25.03306

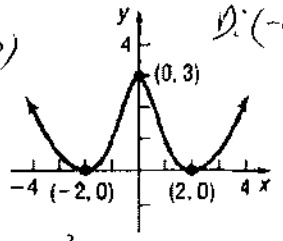
15) Use the following graphs to answer the questions: (4)

a) What are the intervals of increasing and decreasing? I: $(-2,0)\cup(2,\infty)$

b) What is the domain and range of the graphs? D: $(-\infty,\infty)$ R: $[0,\infty)$

c) What are your x- and y-intercepts? $x \to (-2,0),(2,0)$ $y \to (0,3)$

d) Are they symmetric with respect to the x-axis, y-axis, or the origin? Is the y



D: $(-\infty,-2)\cup(-2,2)\cup(2,\infty)$

16) Tell if the following functions are even, odd, or neither: (2)

a) $f(x) = x^3 + 3$ neither. $f(-x) = (-x)^3 + 3 = -x^3 + 3$

b) $f(x) = x^2 - x$ $(-x)^2 - (-x)$ $x^2 + x$ neither.

17) Convert the following angles to degrees. Put your answers in decimal form. (3)

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

b) $\frac{2\pi}{9} \cdot \frac{180}{\pi}$ 40°

c) $15 \cdot \frac{180}{\pi} = 856.9°$

18) Convert the following angles to radians. Leave π in your answer. (3)

a) $160° \cdot \frac{\pi}{180} = \frac{8\pi}{9}$

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

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

19) State the domain of the following function rules. (6)

a) $f(x) = \frac{x-2}{2x+28}$ $x \neq -14$ $\leftarrow\!\!*\!\!\rightarrow$ -14 $(-\infty,-14)\cup(-14,\infty)$

b) $f(x) = \frac{x+5}{\sqrt{2x+10}}$ $x \neq -5$ $x < -5$ $\leftarrow\!\!\times\!\!\rightarrow$ -5 $(-5,\infty)$

20) Given the following piecewise function, find each value. (3)

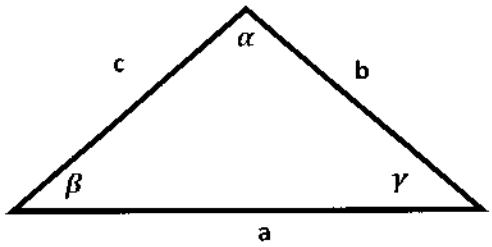
a) $f(1) = 3$ b) $f(0) = 1$ c) $f(5) = 4$

$$f(x) = \begin{cases} x^2 + 1 \text{ if } x < 1 \\ 2 + x \text{ if } x = 1 \\ 9 - x \text{ if } x > 1 \end{cases}$$

21) Fill in the following table for the angles given. (11)

$\theta \to$	a) $-90°$	b) $\frac{7\pi}{6}$	c) $\frac{3\pi}{4}$
Quadrant:	b/w III & IV	III	II
$\sin(\theta)$	-1	$-\frac{1}{2}$	$+\frac{\sqrt{2}}{2}$
$\cos(\theta)$	0	$-\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{2}}{2}$
$\tan(\theta)$	und.	$+\frac{\sqrt{3}}{3}$	-1
$\csc(\theta)$	-1	-2	$+\sqrt{2}$
$\sec(\theta)$	und.	$-\frac{2\sqrt{3}}{3}$	$-\sqrt{2}$
$\cot(\theta)$	0	$+\sqrt{3}$	-1

Name: Key 2/2/2018 Trig – Test 4



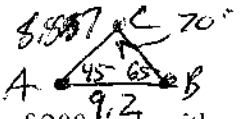
1) Given the triangle above, find the missing values of the triangle for each situation.

Given:	α	β	γ	a	b	c
a)	~~41°~~ 39°	100°	~~39°~~ 41°	3.83	6	4
b)	94.9°	50°	35.1°	10.41	8	6
c)	100°	60°	20°	8	7.04	2.78
d)	50°	50°	80°	7	7	9
e)	40°	91.5°	48.5°	2.57	4	3

2) Fill in the following table for the angles given.

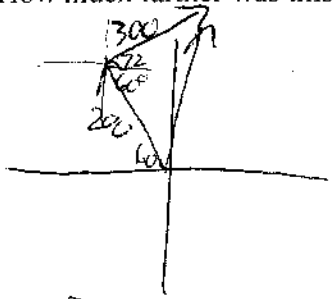
θ →	a) −60°	b) ~~215°~~ 225°	c) $\frac{7\pi}{6}$ 30°
Quadrant:	IV	III	III
sin(θ)	$-\sqrt{3}/2$	$-\sqrt{2}/2$	$-1/2$
cos(θ)	$+1/2$	$-\sqrt{2}/2$	$-\sqrt{3}/2$
tan(θ)	$-\sqrt{3}$	$+1$	$+\sqrt{3}/3$
csc(θ)	$-2\sqrt{3}/3$	$-\sqrt{2}$	-2
sec(θ)	$+2$	$-\sqrt{2}$	$-2\sqrt{3}/3$
cot(θ)	$-\sqrt{3}/3$	$+1$	$+\sqrt{3}$

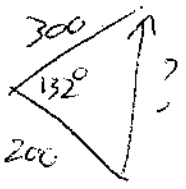
3) Two forest rangers stationed 9.2 miles apart at points A and B in a mountain range observe the same illegal campfire at point C some distance away. They measure angles CAB and CBA to be 45° & 65° respectively. How far is each ranger from the campfire?



AC = 8.87mil
BC = 6.92mil.

~~4~~ A pilot flew his airplane at a constant speed of 200 mph with a 120° heading. After one hour of flying he changed the direction of his course to 72°. He continued in this direction for one and one-half hours to reach his destination. How much farther was this flight than a straight-line flight to his destination?

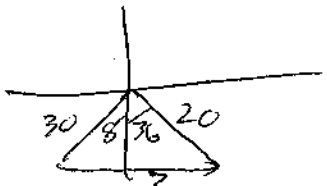




500
− 458.6
41.6mil.

$c^2 = 300^2 + 200^2 - 300(200)\cos(132$

c = 458.6mil.



5) A fishing boat adrift at sea indicated its position as 20 miles S36°E from a coast guard station. A coast guard patrol boat indicated its position as 30 miles S8°W of the coast guard station. How far was the patrol boat from the fishing boat?

$c^2 = 30^2 + 20^2 - 2 \cdot 30 \cdot 20 \cos(44)$

$c = 20.9$ mi

6) Fill in the following table about the parent functions.

Function	Domain	Range	Min	Max	Period	Symmetry	x-inter
Sin	$(-\infty, \infty)$	$[-1, 1]$	$(270, -1)$	$(90, 1)$	$360°$	origin	$0 + 180n$
Cos	$(-\infty, \infty)$	$[-1, 1]$	$(180, -1)$	$(0, 1)$	$360°$	y-axis	$90 + 180n$
Tan	$(-\infty, \infty)$ except odd mult. 90°.	$(-\infty, \infty)$	none.	none.	$180°$	origin	$0 + 180n$.

7) For the following trig functions, find their period.

a) $\cos(15\theta)$

$15\theta = 360$

$\theta = 24°$

b) $6\tan\left(\frac{\theta}{10}\right)$

$\frac{\theta}{10} = 180$

$\theta = 1800°$

c) $-3\cos(4\theta)$

$4\theta = 360$

$\theta = 90°$

Name: Key 3/2/2018 Trig – Test 5

1) Simplify the following and write your answer in scientific notation.

a) $\frac{7.65*10^{-2}}{5.67*10^{4}}$ $= 1.349 \times 10^{-6}$

b) $(42.3 * 10^{4})(6.23 * 10^{-14})$

$263.5 \times 10^{-10} = 2.635 \times 10^{-8}$

c) $(10^{5} * 10^{4})^{-2}$

$(10^{9})^{-2} = 10^{-18}$

d) $(7.54 * 10^{-2})(3.45 * 10^{9})$

$26.01 \times 10^{7} = 2.601 \times 10^{8}$

2) Give the name of the following units.

a) dJ decijoule

b) km kilometer

c) mg milligram

d) hL hectoliter

3) Give the abbreviation of the following units.

a) picowatt pW

b) centimeter cm

c) microsecond μsec

d) millijoule mJ

4) One Step Conversions

a) 0.0723 kJ to J

$7.23 \times 10^{-2}\ kJ \left| \frac{10^{3}\ J}{1\ kJ} \right. = 7.23 \times 10^{1}\ J$

b) 445 s to ms

$4.45 \times 10^{2}\ s \left| \frac{10^{3}\ ms}{1\ s} \right. = 4.45 \times 10^{5}\ ms$

5) Two Step Conversions

a) 936800 dm to Mm

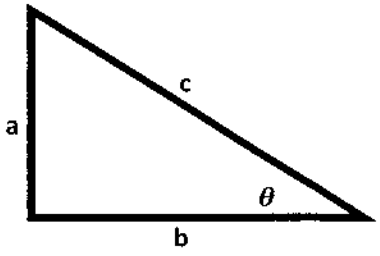
$9.368 \times 10^{5}\ dm \left| \frac{1\ m}{10\ dm} \right| \frac{1\ Mm}{10^{6}\ m} = 9.368 \times 10^{-2}\ Mm$

b) 0.4744 nJ to μJ

$4.744 \times 10^{-1}\ nJ \left| \frac{1\ J}{10^{9}\ nJ} \right| \frac{10^{6}\ \mu J}{1\ J} = 4.744 \times 10^{-4}\ \mu J$

6) We use several Pythagorean Identities to establish other identities. Show how you can go from $a^2 + b^2 = c^2$ to $1 + \tan^2(\theta) = \sec^2(\theta)$.

$\frac{a^2}{b^2} + \frac{b^2}{b^2} = \frac{c^2}{b^2}$



$\tan^2 + 1 = \sec^2$

7) Basic Conversions

a) 28.68 c to gal $\frac{1\text{ pt}}{2\text{ c}}\frac{1\text{ qt}}{2\text{ pt}}\frac{1\text{ gal}}{4\text{ qt}}$ = 1.793 gal

b) 0.004279 g to lbs $\frac{1\text{ oz}}{28.39}\frac{1\text{ lbs}}{16\text{ oz}}$ = 9.45×10^{-6} lb

8) You have driven $9 * 10^{10} mil$ in 1000hr. How fast were you going?

$9\times10^{10}\text{ mi}\cdot\frac{5280\text{ ft}}{1\text{ mil}}\frac{12\text{ in}}{1\text{ ft}}\frac{2.54\text{ cm}}{1\text{ in}}\frac{1\text{ m}}{10^2\text{ cm}} = 1.448\times10^{14}\text{ m}$

$1000\text{ hr}\cdot\frac{60\text{ min}}{1\text{ hr}}\frac{60\text{ sec}}{1\text{ min}} = 3600000\text{ sec}$

$\frac{1.448\times10^{14}}{3600000} = 4.02\times10^{7}\frac{\text{m}}{\text{sec}}$

9) You drove 90ft at 600m/hr. How long did it take you?

$90\text{ ft}\cdot\frac{12\text{ in}}{1\text{ ft}}\frac{2.54\text{ cm}}{1\text{ in}}\frac{1\text{ m}}{10^2\text{ cm}} = 27.43\text{ m}$

$\frac{600\text{ m}}{\text{hr}}\frac{1\text{ hr}}{60\text{ min}}\frac{1\text{ min}}{60\text{ sec}} = .167\frac{\text{m}}{\text{sec}}$

$\frac{27.43}{.167} = 164.3\text{ sec}$

10) You are driving 456ft/sec for 20hr. How far have you gone?

$\frac{456\text{ ft}}{\text{sec}}\frac{1\text{ m}}{12\text{ ft}}\frac{2.54\text{ cm}}{1\text{ in}}\frac{1\text{ m}}{10^2\text{ cm}} = .965\frac{\text{m}}{\text{sec}}$

$20\text{ hr}\cdot\frac{60\text{ min}}{1\text{ hr}}\frac{60\text{ sec}}{1\text{ min}} = 72000$

$.965\cdot72000 = 69480\text{ m}$

11) Write the following numbers in scientific notation.

a) 1234 1.234×10^{3}

b) 9876000 9.876×10^{6}

c) 0.06543 6.543×10^{-2}

d) 0.003985 3.985×10^{-3}

12) Establish the following identities.

a) $\sec(\theta)-\tan(\theta)=\frac{\cos(\theta)}{1+\sin(\theta)}$ $\frac{(1-\sin)}{(1-\sin)} = \frac{\cos-\cos\sin}{1-\sin^2} = \frac{\cos}{\cos}\frac{\cos\sin}{\cos} = \frac{1}{\cos}-\frac{\sin}{\cos} = \sec-\tan$

b) $3\sin^2(\theta)+4\cos^2(\theta)=3+\cos^2(\theta)$ $3(1-\cos^2)+4\cos^2 = 3-3\cos^2+4\cos^2$ ✓

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

d) $\sec(\theta)*\sin(\theta)=\tan(\theta)$ $\frac{1}{\cos}\cdot\sin = \frac{\sin}{\cos} = \tan$ ✓

13) There are multiple definitions of sine, cosine, tangent, cosecant, secant, and cotangent. List out two definitions for each. If you need to invoke a triangle use the one above for reference.

$Sin(\alpha)$ = opp/hyp = $\frac{1}{csc}$

$Cos(\alpha)$ = adj/hyp = $\frac{1}{sec}$

$Tan(\alpha)$ = opp/adj = $\frac{1}{cot}$

$Csc(\alpha)$ → hyp/opp = $\frac{1}{sin}$

$Sec(\alpha)$ → hyp/adj = $\frac{1}{cos}$

$Cot(\alpha)$ → adj/opp = $\frac{1}{tan}$

Name: 4/17/2018 Trig – Test 6

1) Find the exact value of the following trig functions.

a) $\cos(285°)$ | b) $\sin\left(\frac{\pi}{8}\right)$

$\cos(225+60) = \cos(225)\cos(60) - \sin(225)\sin(60)$ ($-\frac{\sqrt{2}}{2}$, $\frac{1}{2}$, $-\frac{\sqrt{2}}{2}$, $\frac{\sqrt{3}}{2}$)

$= -\frac{\sqrt{2}}{4} + \frac{\sqrt{6}}{4} = \frac{-\sqrt{2}+\sqrt{6}}{4}$ (6)

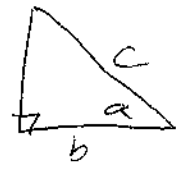
$\frac{\pi}{4}/2$, $45/2$

$\sin\left(\frac{45}{2}\right) = \pm\sqrt{\frac{1-\cos(45)}{2}}$ ($\frac{\sqrt{2}}{2}$) $= \sqrt{\frac{2-\sqrt{2}}{4}} = \frac{1}{2}\sqrt{2-\sqrt{2}}$

2) We use several Pythagorean Identities to establish other identities. Show how you can go from $a^2 + b^2 = c^2$ to $1 + \cot^2(\alpha) = \csc^2(\alpha)$.

$\frac{a^2}{a^2} + \frac{b^2}{a^2} = \frac{c^2}{a^2}$ (3)

$1 + \cot^2(\alpha) = \csc^2(\alpha)$



3) Find the exact value of the following trig functions.

a) $\sin(20°)\cos(65°) - \sin(65°)\cos(20°)$ | b) $\cos(40°)\cos(20°) - \sin(40°)\sin(20°)$

$\sin(20-65)$ (6)

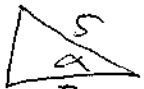
$\sin(-45) = -\frac{\sqrt{2}}{2}$

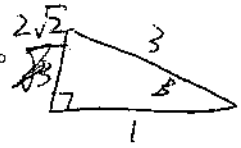
$\cos(40+20) = \cos(60)$

$= \frac{1}{2}$

4) Find the exact value of each of the following under the given conditions.

$\sin(\alpha) = \frac{4}{5}, 0° < \alpha < 90°$ & $\cos(\beta) = \frac{1}{3}, -90° < \beta < 0°$ (6)





a) $\sin(\alpha+\beta)$ | b) $\cos(\alpha+\beta)$ | c) $\sin(\alpha-\beta)$

$\sin(\alpha)\cos(\beta) + \sin(\beta)\cos(\alpha)$

$\frac{4}{5}\cdot\frac{1}{3} + \frac{-2\sqrt{2}}{3}\cdot\frac{3}{5} = \frac{4}{15} + \frac{-6\sqrt{2}}{15} = \frac{4-6\sqrt{2}}{15}$

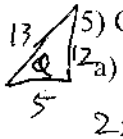
$\cos\alpha\cos\beta - \sin\alpha\sin\beta$

$\frac{3}{5}\cdot\frac{1}{3} - \frac{4}{5}\cdot\frac{-2\sqrt{2}}{3} = \frac{3+8\sqrt{2}}{15}$

$\sin\alpha\cos\beta - \sin\beta\cos\alpha$

$\frac{4}{5}\cdot\frac{1}{3} - \frac{-2\sqrt{2}}{3}\cdot\frac{3}{5} = \frac{4+6\sqrt{2}}{15}$

5) Given: $\cos(\theta) = \frac{5}{13}, 0 < \theta < \frac{\pi}{2}$. Find:



a) $\sin(2\theta)$ | b) $\cos(2\theta)$ | c) $\sin\left(\frac{\theta}{2}\right)$ | d) $\cos\left(\frac{\theta}{2}\right)$

$2\sin(\theta)\cos(\theta)$ (6)

$2\cdot\frac{12}{13}\cdot\frac{5}{13} = \frac{120}{169}$

$\cos^2 - \sin^2$

$\frac{25}{169} - \frac{144}{169} = \frac{-119}{169}$

$\pm\sqrt{\frac{1-\cos\theta}{2}}$

$\sqrt{\frac{1-\frac{5}{13}}{2}} = \sqrt{\frac{\frac{8}{13}}{2}} = \sqrt{\frac{4}{13}} = \frac{2}{13}\sqrt{13}$

$\sqrt{\frac{1+\cos\theta}{2}}$

$\sqrt{\frac{1+\frac{5}{13}}{2}} = \sqrt{\frac{\frac{18}{13}}{2}} = \sqrt{\frac{9}{13}} = \frac{3}{13}\sqrt{13}$

6) We use the sum and difference formulas to derive several other formulas. Show how you can go from the $\sin(\alpha+\beta)$ formula to the $\sin(2\theta)$ formula.

(3)

$\sin(\alpha+\beta) = \sin\alpha\cos\beta + \sin\beta\cos\alpha$

$= \sin\theta\cos\theta + \sin\theta\cos\theta$

$\sin(2\theta) = 2\sin\theta\cos\theta$ ✓

7) Match the following identities.

I $\sin(\alpha-\beta)$ — ~~A.~~ $2\sin(\theta)\cos(\theta)$ — B. $\cos(\alpha)\cos(\beta)+\sin(\alpha)\sin(\beta)$

K $\cos(\alpha+\beta)$ — ~~C.~~ $\frac{\tan(\alpha)+\tan(\beta)}{1-\tan(\alpha)\tan(\beta)}$ — D. $\sin(\alpha)\cos(\beta)+\sin(\beta)\cos(\alpha)$

(4) C $\tan(\alpha+\beta)$ — ~~E.~~ $2\cos^2(\theta)-1$ — F. $\pm\sqrt{\frac{1-\cos(\theta)}{1+\cos(\theta)}}$

A $\sin(2\theta)$ — G. $\frac{\tan(\alpha)-\tan(\beta)}{1+\tan(\alpha)\tan(\beta)}$ — H. $\pm\sqrt{\frac{1+\cos(\theta)}{2}}$

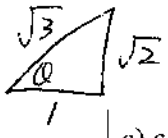
E, J $\cos(2\theta)$ — ~~I.~~ $\sin(\alpha)\cos(\beta)-\sin(\beta)\cos(\alpha)$ — ~~J.~~ $\cos^2(\theta)-\sin^2(\theta)$

L $\sin\left(\frac{\theta}{2}\right)$ — ~~K.~~ $\cos(\alpha)\cos(\beta)-\sin(\alpha)\sin(\beta)$ — L. $\pm\sqrt{\frac{1-\cos(\theta)}{2}}$

H $\cos\left(\frac{\theta}{2}\right)$ — M. $\frac{2\tan(\theta)}{1-\tan^2(\theta)}$ — ~~M.~~ $2\sin^2(\theta)-1$

$\cos = -\frac{1}{\sqrt{3}}$

8) Given: $\sec(\theta) = -\sqrt{3}, \sin(\theta) < 0$. Find:



a) $\sin(2\theta)$ | b) $\cos(2\theta)$ | c) $\sin\left(\frac{\theta}{2}\right)$ | d) $\cos\left(\frac{\theta}{2}\right)$

(8)

a) $2\sin\theta\cos\theta$

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

$+\frac{2\sqrt{2}}{3}$

b) $\cos^2\theta - \sin^2\theta$

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

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

c) $\pm\sqrt{\frac{1-\cos\theta}{2}}$ ($\cos\theta = -\frac{1}{\sqrt{3}}$)

$\sqrt{\frac{\sqrt{3}+1}{2\sqrt{3}}}$

$\frac{\sqrt{3}}{6}\sqrt{6+2\sqrt{3}}$

d) $\sqrt{\frac{1+\frac{-1}{\sqrt{3}}}{2}}$

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

$\frac{\sqrt{3}}{6}\sqrt{6-2\sqrt{3}}$

9) Find the exact value of the following:

a) $\sin(67.5°)$ | b) $\cos(105)$ | c) $\tan\left(\frac{7\pi}{8}\right)$ $\frac{7\pi}{4}/2$ 315

(6)

a) $\sin\left(\frac{135}{2}\right) = \sqrt{\frac{1-\cos(135)}{2}}$

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

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

b) $\cos\left(\frac{210}{2}\right) = -\sqrt{\frac{1+\cos(210)}{2}}$ (30)

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

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

c) $\tan\left(\frac{315}{2}\right) = -\sqrt{\frac{1-\cos 315}{1+\cos 315}}$

$= -\sqrt{\frac{1-\sqrt{2}/2}{1+\sqrt{2}/2}}$

$= -\sqrt{\frac{2-\sqrt{2}}{2+\sqrt{2}}\cdot\frac{(2-\sqrt{2})}{(2-\sqrt{2})}}$

$= -\sqrt{\frac{(2-\sqrt{2})^2}{2}\cdot\frac{2}{2}}$

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

Name: ~~Morgan~~ Key 1/12/2018 Trig – Quiz 13

1) If $\sin\theta = 0.3$, then find the following:

a) $\cos(90-\theta)$ .3 | b) $\sin^2\theta$ .09 | c) $\cos^2\theta$ .91 | d) $\sec^2\theta$ $\frac{100}{91}$

2) Match the following forms with their definitions

C W-2 — A. form used by employees to inform employers of exemptions

A W-4 — B. form used to report income to the state

D 1040 — C. form used by employers to report income paid to an employee

B ND-1 — D. form used to report income to the IRS

3) Find the exact value of each expression. Do not use a calculator.

a) $\tan(-120)$ 60° $+\sqrt{3}$

b) $\tan(12) - \cot(78)$ $\tan(12) = 0$

c) $\cot(40) - \frac{\cos(40)}{\sin(40)}$ $\cot(40) - \cot(40) = 0$

d) $\sec(35)\csc(55) - \tan(35)\cot(55)$ $\sec(35)$ $\tan(35)$ $\sec^2(35) - \tan^2(35) = 1$

4) Find the exact value of the six trig functions.

a) $a = 5, b = 12$ angle: α

sin 5/13 csc 13/5 tan 5/12

cos 12/13 sec 13/12 cot 12/5

b) $a = \sqrt{3}, b = 2$ angle: β

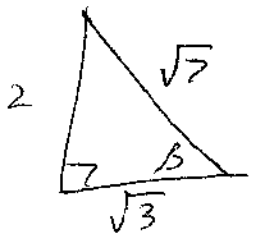
sin $2\sqrt{7}/7$ csc $\frac{2\sqrt{7}}{2}$ tan $2\sqrt{3}/3$

cos $\sqrt{21}/7$ sec $\frac{\sqrt{21}}{3}$ cot $\sqrt{3}/2$

5) Find the reference angle for each angle.

a) -30° $\theta = 30^\circ$

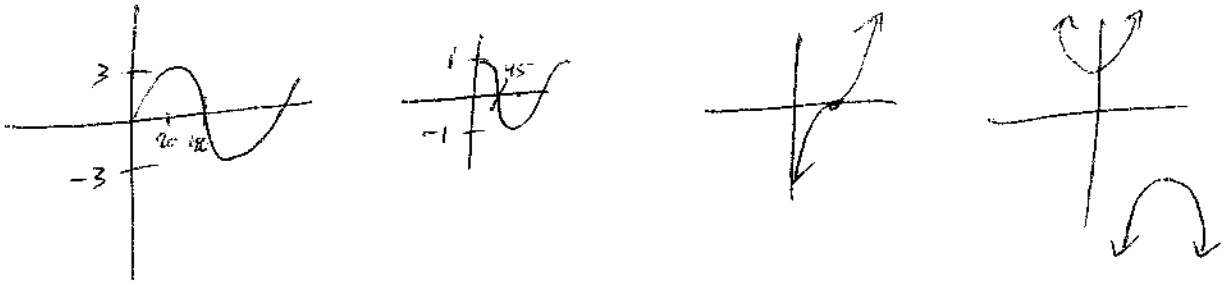
b) $-\frac{7\pi}{6}$ $\frac{14\pi}{7}$ -210 30°



Name: Morgan 1/19/2018 Trig – Quiz 14

1) Sketch the following functions. Label any important points on the graph.

a) $3\sin(x)$ | b) $\cos(2x)$ | c) $\tan\left(x-\frac{\pi}{2}\right)$ | d) $\sec(x)$



2) For the functions above, describe the transformations done to each. If nothing was done, state "original parent function."

a) vertical stretch 3

b) horizontal compression. $\frac{1}{2}$

c) ~~shift~~ Shift right $\frac{\pi}{2}$

d) original.

3) Fill in the following table about the parent functions.

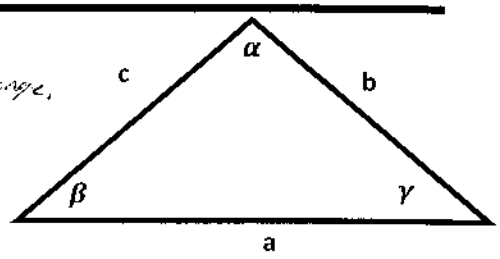
Function	Domain	Range	Min	Max	Period	Symmetry	x-inter
Sin	$(-\infty,\infty)$	$[-1,1]$	$(270,-1)$	$(90,1)$	360°	origin	$0+180n$
Cos	↓	$[-1,1]$	$(180,-1)$	$(0,1)$	↓	~~y-axis~~	$90+180n$
Tan	$(-\infty,\infty)$ except odd mult of 90	$(-\infty,\infty)$	—	—	180°	origin	$0+180n$
Csc	$(-\infty,-1]\cup[1,\infty)$ → $(-\infty,\infty)$ except $180n$.	$(-\infty,-1]\cup[1,\infty)$	$(90,1)$	$(270,-1)$	360°	origin	—
Sec	$(-\infty,\infty)$ except $90+180n$	$(-\infty,-1]\cup[1,\infty)$	$(0,1)$	$(180,-1)$	↓	y-axis	—
Cot	$(-\infty,\infty)$ except $180n$.	$(-\infty,\infty)$	—	—	180°	origin	$90+180n$

4) What does having a period mean? Outside of trig functions, what is something else that has this quality?

↳ repeats after so long. Clock,

Name: Morgan 1/26/2018 Trig – Quiz 15

1) Using the triangle and the values given below, ~~find the area of the triangle~~. Solve the triange.



Given:	α	β	γ	a	b	c
a)	64.8°	50°	64.8°	3	2.54	3
b)	95°	33.8°	51.2°	8.95	5	7
c)	~~55.2°~~ 55.2°	~~55.2°~~ 55.2°	~~110.3°~~ 69.7°	7	7	8

2) For the following trig functions, find their period.

a) $\sin(6\theta)$

$6\theta = 360$

$\theta = 60°$

b) $6\tan\left(\frac{\theta}{2}\right)$

$\frac{\theta}{2} = 180°$

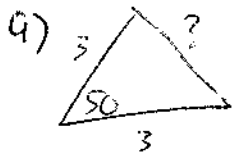
$\theta = 360°$

c) $-3\cos(10\theta)$

$10\theta = 360$

$\theta = 36°$

a)



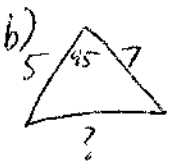
$x^2 = 3^2 + 3^2 - 2\cdot3\cdot3\cos(50)$

$x = 2.54$

$\frac{2.54}{\sin(50)} = \frac{3}{\sin(\alpha)}$

$\alpha = 64.8$

b)



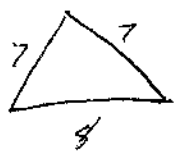
$x^2 = 5^2 + 7^2 - 2\cdot5\cdot7\cos(95)$

$x = 8.95$

$\frac{\sin(\beta)}{5} = \frac{\sin(95)}{8.95}$

$\beta =$

c)



$8^2 = 7^2 + 7^2 - 2\cdot7\cdot7\cos(\gamma)$

$\cos(\gamma) = +.3469$

$\gamma = ~~110.3~~ 69.7°$

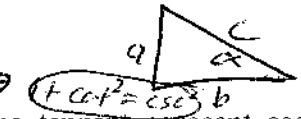
$\frac{\sin(69.7°)}{8} = \frac{\sin(\alpha)}{7}$

$\alpha =$

Name: Morgan 2/8/2018 Trig – Quiz 17

1) We use several Pythagorean Identities to establish other identities. Show how you can go from $a^2 + b^2 = c^2$ to $1 + \cot^2(\alpha) = \csc^2(\alpha)$.

$\frac{a^2}{a^2} + \frac{b^2}{a^2} = \frac{c^2}{a^2}$ $\rightarrow$ $1 + \cot^2 = \csc^2$



2) There are multiple definitions of sine, cosine, tangent, cosecant, secant, and cotangent. List out two definitions for each. If you need to invoke a triangle use the one above for reference.

$Sin(\alpha) = opp/hyp = 1/csc$

$Cos(\alpha) = adj/hyp = 1/sec$

$Tan(\alpha) = opp/adj = 1/cot$

$Csc(\alpha)$ $\rightarrow hyp/opp = \frac{1}{sin}$

$Sec(\alpha)$ $\rightarrow hyp/adj = 1/cos \rightarrow adj/opp = 1/tan$

$Cot(\alpha)$

3) Establish the following identities.

a) $(\sec(\theta) + \tan(\theta))(\sec(\theta) - \tan(\theta)) = 1$

$\sec^2 - \tan^2 = 1$ ✓ $1 + \tan^2 = \sec^2$

b) $\sec(\theta) * \sin(\theta) = \tan(\theta)$

$\frac{1}{\cos} \cdot \sin$ $\frac{\sin}{\cos} = \tan$ ✓

4) Establish the following identities.

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

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

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

$1 + \tan^2(\theta) = \sec^2(\theta)$ ✓

b) $\tan(\theta)\cot(\theta) - \cos^2(\theta) = \sin^2(\theta)$

$\frac{\sin}{\cos} \cdot \frac{\cos}{\sin} - \cos^2 = \sin^2$

$1 - \cos^2 = \sin^2$ ✓

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

Name: Morgan 2/16/2018 Trig – Quiz 18

1) We use several Pythagorean Identities to establish other identities. Show how you can go from $a^2 + b^2 = c^2$ to $1 + \tan^2(\alpha) = \sec^2(\alpha)$.

$\frac{a^2}{b^2} + \frac{b^2}{b^2} = \frac{c^2}{b^2}$ $\quad \frac{a^2}{b^2} + 1 = \frac{c^2}{b^2}$ $\quad \tan^2 + 1 = \sec^2$

2) Give the name or abbreviation of the following units.

a) dJ decijoule

b) km kilometer

c) microsecond μsec

d) millijoule mJ

3) Establish the following identities.

a) $\sec(\theta) - \tan(\theta) = \frac{\cos(\theta)}{1+\sin(\theta)}$ $\quad \frac{(1-\sin)}{(1-\sin)}$

$= \frac{\cos - \sin\cos}{1-\sin^2} = \frac{\cos - \sin\cos}{\cos^2}$

b) $3\sin^2(\theta) + 4\cos^2(\theta) = 3 + \cos^2(\theta)$

$3(1-\cos^2) + 4\cos^2$

$3 - 3\cos^2 + 4\cos^2$

$3 + \cos^2$ ✓

4) Establish the following identities.

a) $\sec^4(\theta) - \sec^2(\theta) = \tan^4(\theta) + \tan^2(\theta)$

$\sec^2(\sec^2 - 1)$

$(1 + \tan^2)\ \tan^2$

$\tan^2 + \tan^4$ ✓

b) $\frac{\sec(\theta)}{\csc(\theta)} + \frac{\sin(\theta)}{\cos(\theta)} = 2\tan(\theta)$

$\frac{\cos}{\cos^2} - \frac{\sin\cos}{\cos^2}$

$\frac{1}{\cos} - \frac{\sin}{\cos}$

$\sec - \tan$ ✓

$\sin\cos \frac{\frac{1}{\cos}}{\frac{1}{\sin}} + \tan$

$\frac{\sin}{\cos} + \tan$

$\tan + \tan$

$2\tan\theta$ ✓

Name: Morgan 3/2/2018 Trig – Quiz 20

1) Give the name or abbreviation of the following units.

a) dJ decijoule | b) km kilometer

c) microsecond μsec | d) millijoule mJ

2) One Step Conversions

a) 0.0723 kJ to J

$$\frac{7.23\times10^{-2}\ kJ}{1\ kJ}\left|\frac{10^{3}\ J}{}\right. = 7.23\times10^{1}\ J$$

b) 445 s to ms

$$\frac{4.45\times10^{2}\ s}{1\ s}\left|\frac{10^{3}\ ms}{}\right. = 4.45\times10^{5}\ ms$$

3) Write the following numbers in scientific notation.

a) 0.0000462 4.62×10^{-5}

b) 6400000 6.4×10^{6}

4) Basic Conversions

a) 28.68 c to gal

$$\frac{1\ pt}{2\ c}\left|\frac{1\ qt}{2\ pt}\right|\frac{1\ gal}{4\ qt} = 1.793\ gal$$

b) 263500 weeks to days

$$\frac{7\ days}{1\ week}\left| = 1.845\times10^{6}\ days\right.$$

5) Two Step Conversions

a) 936800 dm to Mm

$$\frac{9.368\times10^{5}}{}\left|\frac{1\ m}{10\ dm}\right|\frac{1\ Mm}{10^{6}\ m} =$$

$9.368\times10^{-2}\ Mm$

b) 587.1 Mg to μg

$$\frac{5.871\times10^{2}}{}\left|\frac{10^{6}\ g}{1\ Mg}\right|\frac{10^{6}\ \mu g}{1\ g}$$

$5.871\times10^{14}\ \mu g$

Name: Morgan 3/16/2018 Trig – Quiz 21

Formulas:

$$\cos(\alpha+\beta)=\cos(\alpha)\cos(\beta)-\sin(\alpha)\sin(\beta)$$
$$\cos(\alpha-\beta)=\cos(\alpha)\cos(\beta)+\sin(\alpha)\sin(\beta)$$
$$\sin(\alpha+\beta)=\sin(\alpha)\cos(\beta)+\cos(\alpha)\sin(\beta)$$
$$\sin(\alpha-\beta)=\sin(\alpha)\cos(\beta)-\cos(\alpha)\sin(\beta)$$

1) Find the exact value of the following trig functions.

a) $\cos(165°)$

$\cos(120+45)=\cos(120)\cos(45)-\sin(120)\sin(45)$

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

$=\frac{-\sqrt{2}}{4}-\frac{\sqrt{6}}{4}$

b) $\sin\left(\frac{\pi}{12}\right)=\sin\left(\frac{4\pi}{12}-\frac{3\pi}{12}\right)$ (60 45)

$\sin\left(\frac{\pi}{3}-\frac{\pi}{4}\right)=\sin\left(\frac{\pi}{3}\right)\cos\left(\frac{\pi}{4}\right)-\cos\left(\frac{\pi}{3}\right)\sin\left(\frac{\pi}{4}\right)$

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

$=\frac{\sqrt{6}-\sqrt{2}}{4}$

2) Find the exact value of the following trig functions.

a) $\sin(20°)\cos(10°)+\sin(10°)\cos(20°)$

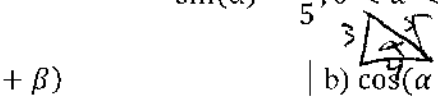
$\sin(30)=\frac{1}{2}$

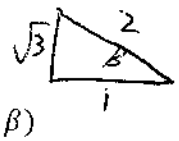
b) $\cos(40°)\cos(10°)+\sin(40°)\sin(10°)$

$\cos(30)=\frac{\sqrt{3}}{2}$

3) Find the exact value of each of the following under the given conditions.

$$\sin(\alpha)=\frac{3}{5},0<\alpha<90°\ \&\ \cos(\beta)=\frac{1}{2},0<\beta<-90°$$





a) $\sin(\alpha+\beta)$

$\sin(\alpha)\cos(\beta)+\sin(\beta)\cos(\alpha)$

$\frac{3}{5}\cdot\frac{1}{2}+\frac{-\sqrt{3}}{2}\cdot\frac{4}{5}$

$\frac{3-4\sqrt{3}}{10}$

b) $\cos(\alpha+\beta)$

$\cos(\alpha)\cos(\beta)-\sin\alpha\sin(\beta)$

$\frac{4}{5}\cdot\frac{1}{2}-\frac{3}{5}\left(\frac{-\sqrt{3}}{2}\right)$

$\frac{4}{10}+\frac{3\sqrt{3}}{10}$

$\frac{4+3\sqrt{3}}{10}$

c) $\sin(\alpha-\beta)$

$\sin(\alpha)\cos(\beta)-\sin(\beta)\cos(\alpha)$

$\frac{3}{5}\cdot\frac{1}{2}-\frac{-\sqrt{3}}{2}\cdot\frac{4}{5}$

$\frac{3+4\sqrt{3}}{10}$

Name: ~~Morgan~~ Key 3/29/2018 Trig – Quiz 23

Formulas:

$$\cos(\alpha+\beta)=\cos(\alpha)\cos(\beta)-\sin(\alpha)\sin(\beta)$$
$$\cos(\alpha-\beta)=\cos(\alpha)\cos(\beta)+\sin(\alpha)\sin(\beta)$$
$$\sin(\alpha+\beta)=\sin(\alpha)\cos(\beta)+\cos(\alpha)\sin(\beta)$$
$$\sin(\alpha-\beta)=\sin(\alpha)\cos(\beta)-\cos(\alpha)\sin(\beta)$$

1) Find the exact value of the following trig functions.

a) $\cos(165°)$ $135+30$

$\cos(135+30)=\cos(135)\cos(30)-\sin(135)\sin(30)$

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

$\frac{-\sqrt{6}-\sqrt{2}}{4}$

b) $\sin\left(\frac{\pi}{12}\right)$ $\frac{60}{\frac{\pi}{3}}-\frac{45}{\frac{\pi}{4}}$

$\sin(60-45)=\sin(60)\cos(45)-\cos(60)\sin(45)$

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

$\frac{\sqrt{6}-\sqrt{2}}{4}$

2) Find the exact value of the following trig functions.

a) $\sin(20°)\cos(10°)+\sin(10°)\cos(20°)$

$\sin(30)=\frac{1}{2}$

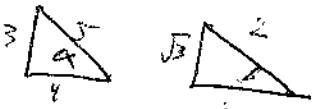
b) $\cos(40°)\cos(10°)+\sin(40°)\sin(10°)$

$\cos(40-10)$

$\cos(30)=\frac{\sqrt{3}}{2}$

3) Find the exact value of each of the following under the given conditions.

$$\sin(\alpha)=\frac{3}{5},0<\alpha<90°\ \&\ \cos(\beta)=\frac{1}{2},0<\beta<90°$$



a) $\sin(\alpha+\beta)$

$\sin(\alpha+\beta)=\sin\alpha\cos\beta+\sin\beta\cos\alpha$

$\frac{3}{5}\cdot\frac{1}{2}+\frac{-\sqrt{3}}{2}\cdot\frac{4}{5}$

$\frac{3-4\sqrt{3}}{10}$

b) $\cos(\alpha+\beta)$

$\cos\alpha\cos\beta-\sin\alpha\sin\beta$

$\frac{4}{5}\cdot\frac{1}{2}-\frac{3}{5}\cdot\frac{\sqrt{3}}{2}$

$\frac{4-3\sqrt{3}}{10}$

c) $\sin(\alpha-\beta)$

$\sin\alpha\cos\beta-\sin\beta\cos\alpha$

$\frac{3}{5}\quad\frac{1}{2}\quad-\quad\frac{\sqrt{3}}{2}\quad\frac{4}{5}$

$\frac{3+4\sqrt{3}}{10}$

Name: Morgan 4/20/2018 Trig – Quiz 26

Formulas:

$$\cos(\alpha+\beta)=\cos(\alpha)\cos(\beta)-\sin(\alpha)\sin(\beta)$$
$$\cos(\alpha-\beta)=\cos(\alpha)\cos(\beta)+\sin(\alpha)\sin(\beta)$$
$$\sin(\alpha+\beta)=\sin(\alpha)\cos(\beta)+\cos(\alpha)\sin(\beta)$$
$$\sin(\alpha-\beta)=\sin(\alpha)\cos(\beta)-\cos(\alpha)\sin(\beta)$$
$$\sin(2\theta)=2\sin(\theta)\cos(\theta)$$
$$\cos(2\theta)=\cos^2(\theta)-\sin^2(\theta)$$
$$\cos(2\theta)=1-2\sin^2(\theta)$$
$$\cos(2\theta)=2\cos^2(\theta)-1$$
$$\tan(2\theta)=\frac{2\tan(\theta)}{1-\tan^2(\theta)}$$
$$\sin\left(\frac{\theta}{2}\right)=\pm\sqrt{\frac{1-\cos(\theta)}{2}}$$
$$\cos\left(\frac{\theta}{2}\right)=\pm\sqrt{\frac{1+\cos(\theta)}{2}}$$
$$\tan\left(\frac{\theta}{2}\right)=\pm\sqrt{\frac{1-\cos(\theta)}{1+\cos(\theta)}}$$

1) Given: $\cos(\theta)=\frac{3}{5}, 0<\theta<\frac{\pi}{2}$. Find:

a) $\sin(2\theta)$ | b) $\cos(2\theta)$ | c) $\sin\left(\frac{\theta}{2}\right)$ | d) $\cos\left(\frac{\theta}{2}\right)$

$2\sin\theta\cos\theta$ $\quad 2\cdot\frac{4}{5}\cdot\frac{3}{5}=\frac{24}{25}$

$\cos^2-\sin^2$ $\quad \frac{9}{25}-\frac{16}{25}=\frac{-7}{25}$ Q III

$\pm\sqrt{\frac{1-\cos}{2}}$ $\quad \sqrt{\frac{1-\frac{3}{5}}{2}}\ \frac{\frac{2}{5}}{2}=\frac{2}{10}=\frac{1}{5}$

$\pm\sqrt{\frac{1+\cos}{2}}=\sqrt{\frac{1+\frac{3}{5}}{2}}=\sqrt{\frac{\frac{8}{5}}{2}}=\frac{8}{10}$

2) Given: $\csc(\theta)=-\sqrt{5}, \cos(\theta)<0$. Find:

a) $\sin(2\theta)$ | b) $\cos(2\theta)$ | c) $\sin\left(\frac{\theta}{2}\right)$ | d) $\cos\left(\frac{\theta}{2}\right)$

$2\sin(\theta)\cos(\theta)$ $\quad 2\cdot\frac{-2}{\sqrt{5}}\cdot\frac{-1}{\sqrt{5}}=\frac{4}{5}$

$\cos^2-\sin^2$ $\quad \frac{1}{5}-\frac{4}{5}=\frac{-3}{5}$

$\pm\sqrt{\frac{1-\cos}{2}}$ $\quad \sqrt{\frac{\sqrt{5}-1}{2\sqrt{5}}\cdot\frac{\sqrt{5}}{\sqrt{5}}}$ $\quad \sqrt{\frac{5-\sqrt{5}}{10}}$ $\quad \frac{1}{10}\sqrt{50-10\sqrt{5}}$

$\pm\sqrt{\frac{1+\cos}{2}}$ $\quad \sqrt{\frac{1+\frac{1}{\sqrt{5}}}{2}}=\sqrt{\frac{\sqrt{5}+1}{2\sqrt{5}}}$ $\quad \sqrt{\frac{5+\sqrt{5}}{10}}$ $\quad \frac{1}{10}\sqrt{50+10\sqrt{5}}$

$\sqrt{\frac{4}{5}}=\frac{2}{5}\sqrt{5}$

3) Find the exact value of the following:

a) $\sin(22.5^\circ)$ | b) $\cos(165)$ | c) $\tan\left(\frac{7\pi}{8}\right)$

$\times 2$ $\quad 45$

$\sin\left(\frac{45}{2}\right)=\sqrt{\frac{1-\cos 45}{2}}$ $\quad =\sqrt{\frac{1-\frac{\sqrt{2}}{2}}{2}\cdot 2}$ $\quad \frac{1}{2}\sqrt{2-\sqrt{2}}$

$\cos\left(\frac{330}{2}\right)$ $\quad -\sqrt{\frac{1+\cos 330}{2}}$ $\quad -\sqrt{\frac{1+\frac{\sqrt{3}}{2}}{2}\cdot 2}$ $\quad -\frac{1}{2}\sqrt{2+\sqrt{3}}$

$\tan\left(\frac{7\pi}{4}/2\right)$ $\quad -\sqrt{\frac{1-\cos(315)}{1+\cos(315)}}$ $\quad -\sqrt{\frac{1-\frac{\sqrt{2}}{2}}{1+\frac{\sqrt{2}}{2}}\cdot 2}=-\sqrt{\frac{2-\sqrt{2}}{2+\sqrt{2}}\cdot\frac{(2-\sqrt{2})}{(2-\sqrt{2})}}$

$=-\frac{2-\sqrt{2}}{2}\sqrt{2}$ $\quad =-\sqrt{\frac{(2-\sqrt{2})^2}{4-2}}=-\frac{2-\sqrt{2}}{\sqrt{2}}\cdot\frac{\sqrt{2}}{\sqrt{2}}$

Name: ~~Morgan~~ Key Last Section Trig

1) Solve each equation on the interval $0 \le \theta < 2\pi$

a) $\tan(\theta) = -\frac{\sqrt{3}}{3}$

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

c) $\sin\left(3\theta + \frac{\pi}{18}\right) = 1$

$3\theta + \frac{\pi}{18} = \frac{4\pi}{4\cdot 2} - \frac{\pi}{18}$

$-\frac{\pi}{18}$

$\frac{3\theta}{3} = \frac{8\pi}{18} = \frac{4\pi}{9/3}$

$\theta = \frac{4\pi}{27}$

d) $\tan(3\theta) = 1$

$\frac{3\theta}{3} = \frac{\pi}{4/3}$ or $\frac{3\theta}{3} = \frac{5\pi}{4/3}$

$\theta = \frac{\pi}{12}, \frac{5\pi}{12}$

2) Solve each equation on the interval $0 \le \theta < 2\pi$

a) $\sec(\theta) = -4$

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

$\cos\theta = \frac{-1}{4}$

$\theta = \cos^{-1}\left(-\frac{1}{4}\right) = 104.5^\circ$ or 255.5°

1.82R 4.46R

b) $\sin(\theta) = 0.4$

$\sin^{-1}(.4)$

2.73R, .41R

156.4°, 23.6°

3) Solve each equation on the interval $0 \le \theta < 2\pi$ ~~2π~~ 360

a) $2\cos^2(\theta) + \cos(\theta) = 0$

b) $2\sin^2(\theta) - \sin(\theta) - 1 = 0$

c) $\sin(2\theta) + \sin(4\theta) = 0$

$\sin(2\theta) + 2\sin(2\theta)\cos(2\theta)$

$\sin(2\theta)\left(1 + 2\cos(2\theta)\right) = 0$

$\sin 2\theta = 0$ or $1 + 2\cos(2\theta) = 0$

$\frac{2\theta}{2} = 0, 180$

$\cos(2\theta) = -\frac{1}{2}$

$\frac{2\theta}{2} = 120, 240$

$\theta = 0, 90$

$\theta = 60, 120$

d) $\sin(\theta) = \cos(\theta)$

45°, 215°

1) (a) $\tan\theta = -\frac{\sqrt{3}}{3}$

$\theta = 150^\circ, 330^\circ$

$\frac{5\pi}{6}, \frac{11\pi}{6}$

3) (a) $2x^2 + x = 0$

$x(2x+1) = 0$

$x = 0, -\frac{1}{2}$

$\cos\theta = 0$ or $\cos(\theta) = -\frac{1}{2}$

$\theta = 90, 270$ 120°, 240°

3b) $2x^2 - x - 1 = 0$

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

$x = 1, -1/2$

	x	-1
$2x$	$2x^2$	$-2x$
1	$1x$	-1

$\sin\theta = 1$ or $\sin\theta = -\frac{1}{2}$

$\theta = 90$, 210°, 330°

x	$+$
-2	-1
1	