Trig practice quiz 2 Name Key

1. After each item the quadrant of the terminal angle is given:

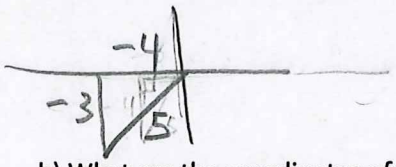
$\sin\left(-\frac{\pi}{4}\right)$ IV $\cos\left(\frac{7\pi}{6}\right)$ III

$\tan\left(-\frac{4\pi}{3}\right)$ II $\sin(5\pi)$ II/III

$\cos\left(\frac{25\pi}{4}\right)$ I $\tan\left(-\frac{11}{2}\pi\right)$ I/II

2. Given $\sin\theta = -3/5$ and $\tan\theta < 0$:

a) Find the x-coordinate of the terminal side of θ with y-coordinate corresponding to -6.



$\sin\theta = -3/5$, $\cos = +\frac{4}{5}$ ref. triangle

Ratios in proportion: $\frac{-3}{-4} = \frac{-6}{x}$, $\boxed{x = -8}$

b) What are the coordinates of the point where the terminal side of θ intersect the unit circle?

$\left(\frac{x}{r}, \frac{y}{r}\right) = \left(\frac{-3}{5}, \frac{-4}{5}\right)$ or $\left(-\frac{6}{10}, -\frac{8}{10}\right)$

same

3. Find the length of the arc that subtends an angle measuring 105° in a circle of radius 8 cm.

$s = \theta \cdot 8\text{cm} = 105° \cdot \frac{\pi}{180°} \cdot 8\text{cm} = \boxed{\frac{14\pi}{3}\text{cm}}$

4. Convert 1.8 radians to degrees.

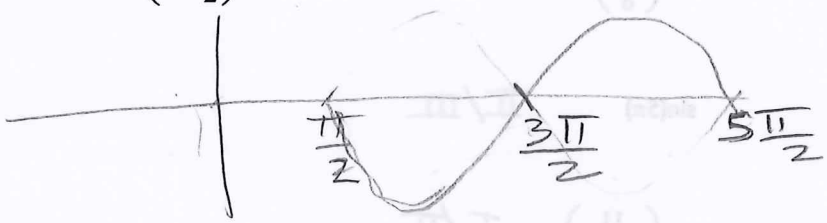
$(1.8)\left(\frac{\pi}{180°}\right) = \frac{1.8\pi}{180}$ degrees

Approximately how many degrees is 1 radian of angle measure?

$1\text{ rad} \cdot \frac{180°}{\pi\text{ rad}} = \frac{180°}{\pi} \approx 57.3°$

5. Graph the following function, showing one full period of the graph with the endpoints and any intercepts labeled clearly:

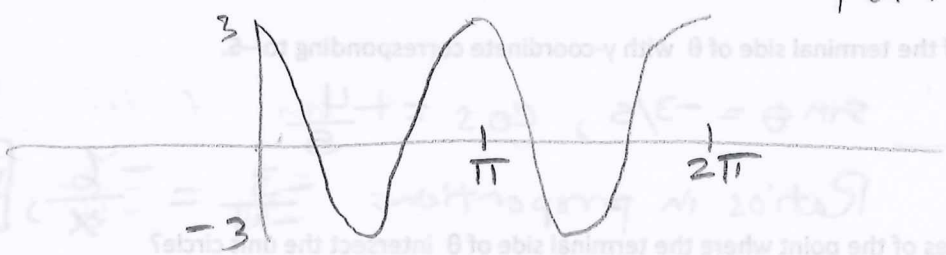
$$f(x) = -\sin\left(x - \frac{\pi}{2}\right)$$



6. Graph the following function, also showing endpoints, but this time show two full periods:

$$g(x) = 3\cos(2x)$$

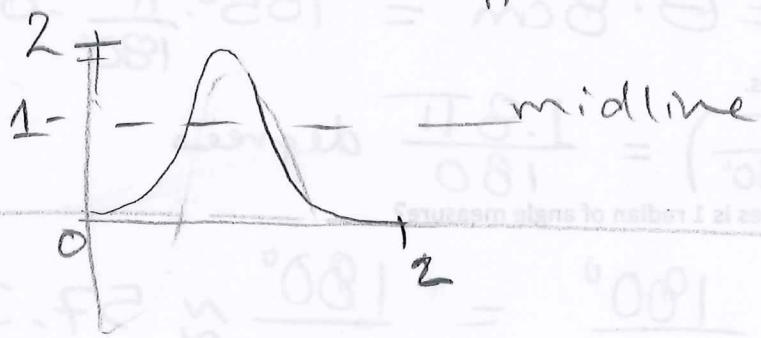
Per: $\frac{2\pi}{2} = \pi$



7. Graph the following function, also showing endpoints, but this time show two full periods:

$$g(x) = -\cos(\pi x) + 1$$

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



Practice!

Key

4. Fill in the info.

$y=\sin^{-1}x$ domain: $[-1,1]$ range: $\left[-\frac{\pi}{2},\frac{\pi}{2}\right]$ ~~period:~~

$y=\cos^{-1}x$ domain: $[-1,1]$ range: $[0,\pi]$ ~~period:~~

$y=\tan^{-1}x$ domain: $(-\infty,\infty)$ range: $\left(-\frac{\pi}{2},\frac{\pi}{2}\right)$ ~~period:~~

5. The formulas for endpoints of sine and cosine function transformations are:

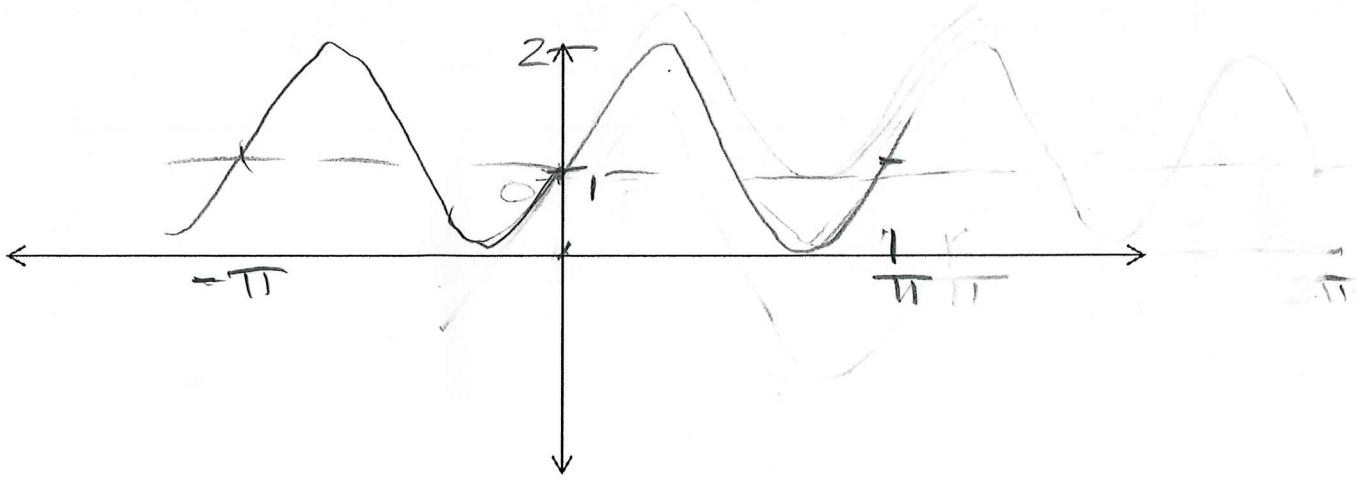
$y=A\sin(Bx+C)+D$ or $y=A\cos(Bx+C)+D$ endpoints: $\frac{-C}{B}$ and $\frac{-C+2\pi}{B}$

For $y=\frac{1}{2}\sin(2x)+1$, fill in the information and sketch two cycles of the function.

amplitude A: $\frac{1}{2}$ period B: $\frac{2\pi}{2}=\pi$

hor. shift C/B: 0 vert. shift D: $+1$ endpts:

Sketch two cycles of $y=\frac{1}{2}\sin(2x)+1$,



Trigonometry Practice Quiz 3 Key

You should be able to do this with no aids by now, notes or otherwise. The amount of looking things up you need to do is a good indication of how prepared you are for the test.

1. Fill in the information:

y = sin x dom: $x \in \mathbb{R}$ range: $[-1, 1]$ period: 2π amplitude: 1 roots on [0, 2π]: $0, \pi, 2\pi$

y = cos x dom: $x \in \mathbb{R}$ range: $[-1, 1]$ period: 2π amplitude: 1 roots on [0, 2π]: $\frac{\pi}{2}, \frac{3\pi}{2}$

y = tan x dom: $x \neq \frac{n\pi}{2}$ n odd range: $y \in \mathbb{R}$ period: π amplitude: ∞ roots on [−π, π]: $0, \pi, -\pi$

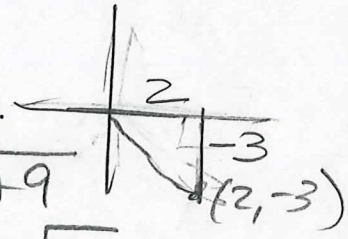
2. Fill in the information for each angle given:

	Complement	Supplement	Positive coterminal	Negative coterminal
64°	26°	116°	424°	−296°
$\frac{\pi^r}{12}$	$\frac{5\pi}{12}$	$\frac{11\pi}{12}$	$\frac{25\pi}{2}$	$-\frac{11\pi}{2}$

3. Fill in the information for each angle given:

	Conversion to π^r or °	Quadrant	Reference angle (in given angle's units)
−208°	$\frac{-208}{180} \cdot \pi = \frac{-52}{45}\pi$	III	28°
$\frac{11\pi^r}{6}$	$\frac{11\pi}{6} \cdot \frac{180}{\pi} = 330°$	IV	$\frac{\pi}{6}$

4. The point (2, −3) lies on the terminal side of angle θ. Find the six trigonometric values of θ.



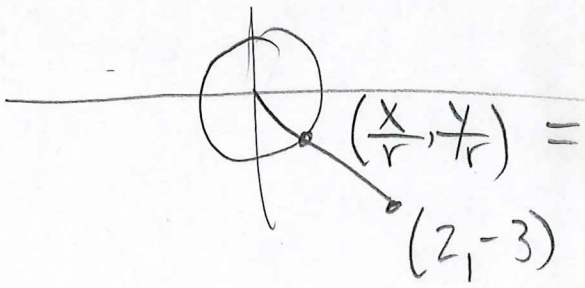
$r = \sqrt{4+9} = \sqrt{13}$

sin θ = $-3/\sqrt{13}$ csc θ = $-\sqrt{13}/3$

cos θ = $2/\sqrt{13}$ sec θ = $\sqrt{13}/2$

tan θ = $-3/2$ cot θ = $-2/3$

Find the coordinates of the point on the *unit circle* that lies on the same terminal side of θ.



$\left(\frac{x}{r}, \frac{y}{r}\right) = \left(\frac{2}{\sqrt{13}}, \frac{-3}{\sqrt{13}}\right)$

5. Evaluate each of these:

sec (π) = $\frac{1}{\cos\pi} = -1$ sin(5π) = 0

tan (π/3) = $\sqrt{3}$ cot (π/3) = $\frac{1}{\tan\pi/3} = \frac{1}{\sqrt{3}}$

cos (−π/2) = 0 csc (0) = $\frac{1}{\sin 0} = \frac{1}{0}$ undefined

6. The sine function and the tangent function are odd functions. The cosine function is an even function.

So, sin(−4π) = $-\sin(4\pi)$ cos(−π/3) = $\cos(\pi/3)$ −tan (5π/6) = $-\tan\left(-\frac{5\pi}{6}\right)$

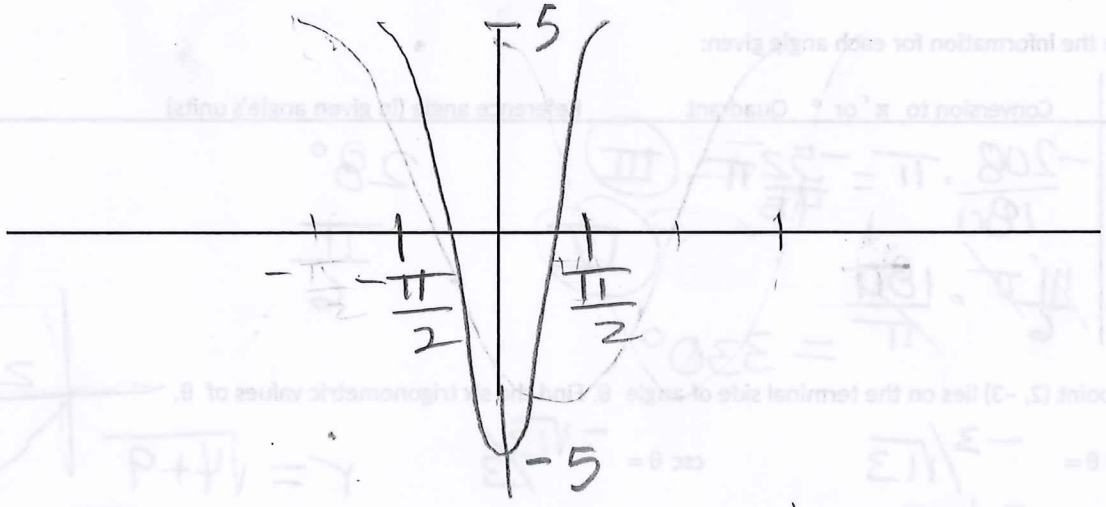
7. What is the equation of a sine function that has an amplitude of 4, a minimum value of −1 and a maximum value of 3 (that is, a range of [−1, 3], and a period of 6 π?

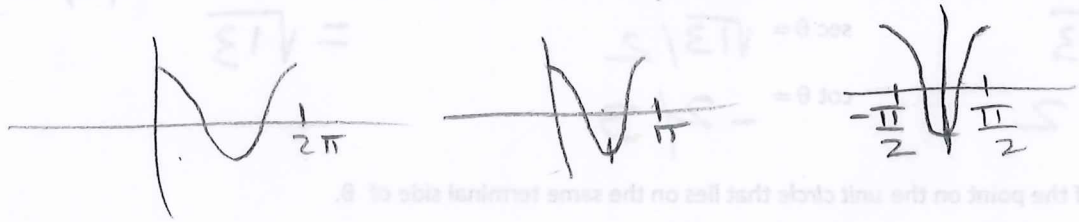
$Per = 6\pi = \frac{2\pi}{B} \rightarrow B = \frac{2\pi}{6\pi} = B = \frac{1}{3}$

$\boxed{y = 2\sin\left(\frac{1}{3}x\right) + 1}$

8. Sketch two cycles of the graph of y = 5cos (2 θ + π). There is no vertical shift. It will help to first find:

Amp 5 Period π Horizontal shift $\pi/2$ left Endpoints of one cycle _____





MATH 108 Quiz #9 Fall 2017 Name Key

Directions: Answer each question as completely as possible. Show all work for credit. Good luck.

1. Suppose $\alpha = 36^\circ$

a) Find the complement of α. $90 - 36 = \boxed{54^\circ}$

b) Find the supplement of α. $180 - 36 = \boxed{144^\circ}$

c) Find two angles that are coterminal with α (one positive and one negative).

$36^\circ + 360^\circ = \boxed{396^\circ}$; $36^\circ - 360^\circ = \boxed{-324^\circ}$

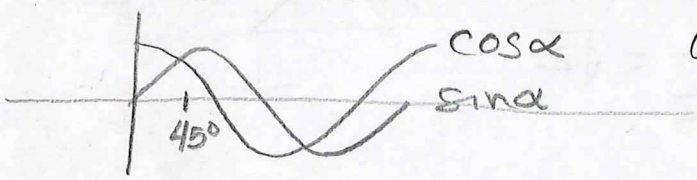
d) Suppose α is a central angle in a circle having radius 9 inches. What is the length of the arc cut by α?

$s = \alpha \cdot r = \alpha \cdot 9$

$s = 80 \cdot \frac{\pi}{180} \cdot 9\text{in} = \boxed{4\pi \text{ in}}$

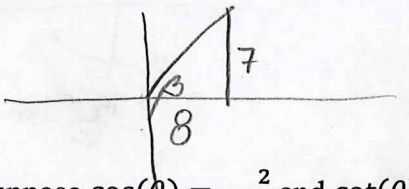
I forgot to name α. Say $\alpha = 80^\circ$.

e) Which is bigger, cos (α) or sin(α)? Justify your answer.



$\cos\alpha > \sin\alpha$ from $\alpha = 0$ to $\alpha = 45^\circ$

2. Suppose β is an acute angle in standard position such that $\tan(\beta) = \frac{7}{8}$. Find the coordinates of the point where the terminal side of β intersects the unit circle.

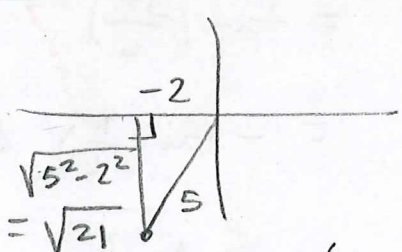


$\tan\beta = \frac{7}{8}$, hyp = radius $= \sqrt{49+64} = \sqrt{113}$

So, pt. on unit circle is $\left(\frac{8}{\sqrt{113}}, \frac{7}{\sqrt{113}}\right)$

3. Suppose $\cos(\theta) = -\frac{2}{5}$ and $\cot(\theta) > 0$. Determine the y-coordinate of the point on the terminal side of θ corresponding to an x-coordinate of -3.

$\cos\theta < 0$
$\cot\theta > 0$ $\rightarrow$ Terminal side of θ lands in Q III



$(x, y) = (-2, -\sqrt{21})$

y-coord.

4. Evaluate each of the following trigonometric expressions:

a) $\sin\left(\frac{\pi}{3}\right) = \frac{\sqrt{3}}{2}$

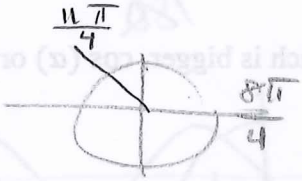
b) $\cos(2\pi) = 1$

c) $\tan\left(\frac{\pi}{4}\right) = 1$

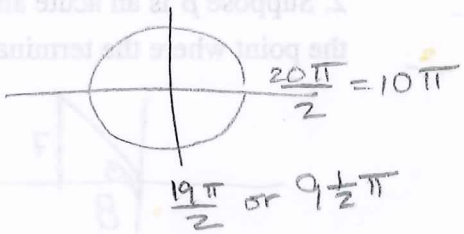
d) $\sin\left(\frac{5\pi}{6}\right) = \frac{1}{2}$

e) $\cos\left(\frac{4\pi}{3}\right) = -\cos\left(\frac{\pi}{3}\right) = -\frac{1}{2}$

f) $\csc\left(\frac{11\pi}{4}\right) = \frac{1}{\sin\frac{11\pi}{4}} = \frac{1}{1/\sqrt{2}} = \sqrt{2}$



g) $\cos\left(\frac{19\pi}{2}\right) = \cos\left(\frac{\pi}{2}\right) = 0$



h) $\tan\left(\frac{101\pi}{6}\right) = \tan\left(16\frac{5}{6}\pi\right)$

falls in QII, where $\tan\theta < 0$;

$= \tan\left(\frac{5\pi}{6}\right)$

use ref angle $\frac{\pi}{6}$

$= -\tan\left(\frac{\pi}{6}\right)$

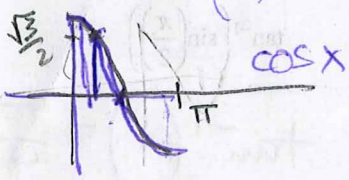
$= -\frac{1}{\sqrt{3}}$

Inverse Trig Functions &
Composite Trig Functions Worksheet

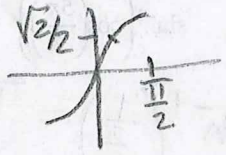
Name Key

Directions: Write the *exact* trigonometric value of the following problems.

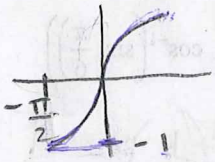
1. $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right) = \frac{\pi}{6}$



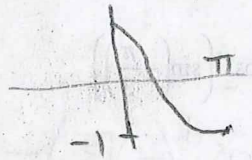
2. $\sin^{-1}\frac{\sqrt{2}}{2} = \frac{\pi}{4}$



3. $\arcsin(-1) = -\frac{\pi}{2}$

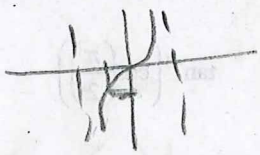


4. $\cos^{-1}(-1) = \pi$

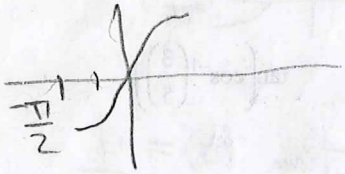


5. $\arctan(1) = \pi/4$

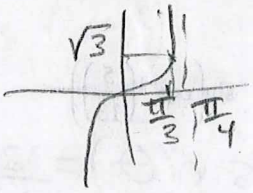
6. $\tan^{-1}(-1) = -\frac{\pi}{4}$



7. $\arcsin\left(-\frac{\sqrt{2}}{2}\right) = -\frac{\pi}{4}$



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



9. $\arccos\frac{1}{2} = \frac{\pi}{3}$

10. $\tan^{-1}\left(-\frac{\sqrt{3}}{3}\right) = -\frac{\pi}{6}$

11. $\arccos\left(-\frac{\sqrt{2}}{2}\right) = \frac{3\pi}{4}$

12. $\cos^{-1} 0 = \frac{\pi}{2}$

13. $\tan^{-1}(0) = 0$

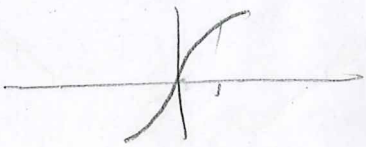
14. $\cot^{-1} 0$ undef

15. $\cos^{-1} 2$ undef

$(-1 \le \cos\theta \le 1)$

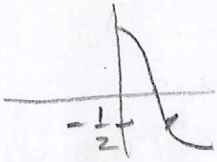
16. $\cos\left(\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)\right)$

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



17. $\sin\left(\cos^{-1}\left(-\frac{1}{2}\right)\right)$

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



18. $\tan(\sin^{-1} 0)$

$\tan 0 = 0$

Answers for 20–27 must be in the inv. fcn range!

19. $\cot(\cos^{-1} 0)$

$= \cot(\pi/2)$

$= \frac{1}{\tan(\pi/2)} = \frac{1}{\infty} = 0$

20. $\sin^{-1}\left(\cos\left(\frac{7\pi}{6}\right)\right)$

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

21. $\cos^{-1}\left(\sin\left(\frac{5\pi}{4}\right)\right)$

$\cos^{-1}\left(-\frac{1}{\sqrt{2}}\right) = \frac{3\pi}{4}$

22. $\cos^{-1}\left(\sin\left(\frac{\pi}{6}\right)\right)$

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

23. $\sin^{-1}\left(\cos\left(\frac{5\pi}{3}\right)\right)$

$\sin^{-1}\left(\frac{1}{2}\right) = \frac{\pi}{3}$

24. $\tan^{-1}\left(\sin\left(\frac{\pi}{2}\right)\right)$

$\tan^{-1}(1) = \frac{\pi}{4}$

25. $\tan^{-1}\left(\cos\left(\frac{\pi}{2}\right)\right)$

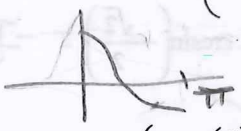
$\tan^{-1}(0) = 0$

26. $\sin^{-1}\left(\sin\left(\frac{3\pi}{4}\right)\right)$

$\sin^{-1}\left(\frac{1}{\sqrt{2}}\right) = \frac{\pi}{4}$

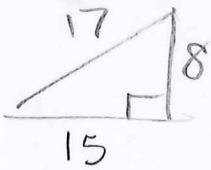
27. $\cos^{-1}\left(\sin\left(-\frac{\pi}{3}\right)\right)$

$\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) = \frac{5\pi}{6}$



28. $\cos\left(\sin^{-1}\left(\frac{8}{17}\right)\right)$

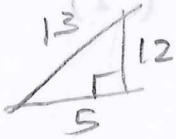
$\cos(\theta) = 15/17$



$289 - 64 = 225$

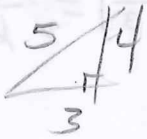
29. $\sin\left(\cos^{-1}\left(\frac{5}{13}\right)\right)$

$\sin(\theta) = \frac{12}{13}$



30. $\tan\left(\cos^{-1}\left(\frac{3}{5}\right)\right)$

$\tan(\theta) = \frac{4}{3}$



31. $\sin^{-1}\left(\cos\left(\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)\right)\right)$

$\sin^{-1}\left(\cos\left(\frac{\pi}{3}\right)\right)$

$= \sin^{-1}\left(\frac{1}{2}\right) = \frac{\pi}{6}$

32. $\tan\left(\sin^{-1}\left(\cos\left(\frac{\pi}{2}\right)\right)\right)$

$\tan(\sin^{-1}(0))$

$= \tan(0) = 0$