PRECALCULUS
Summary of Inverse Functions

Name________________________
date________________block________

Finding Exact Values of Single Inverse Functions: Visualize the unit circle on the coordinate plane. Remember your trigonometric ratios. Be careful of negative values - *the range is restricted*

1) $\cos^{-1}(1) =$ 0
2) $\cos^{-1}(-1) =$ π
3) $\tan^{-1}(1) =$ $\pi/4$

4) $\arctan\left(\frac{\sqrt{3}}{3}\right) =$ $\pi/6$
5) $\arcsin\left(\frac{-\sqrt{3}}{2}\right) =$ $-\pi/3$
6) $\arccos\left(\frac{-\sqrt{2}}{2}\right) =$ $3\pi/4$

7) $\cos^{-1}(-1/2) =$ $2\pi/3$
8) $\sin^{-1}(-2) =$ DNE
9) $\tan^{-1}(0) =$ 0

10) $\arctan(-1) =$ $-\pi/4$
11) $\arccos\left(-\frac{\sqrt{3}}{2}\right) =$ $5\pi/6$
12) $\arccos(\sqrt{3}) =$ DNE

13) $\arcsin(0) =$ 0
14) $\arcsin(1/2) =$ $\pi/6$
15) $\arccos(1/2) =$ $\pi/3$

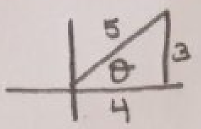
16) $\arctan(-\sqrt{3})$ $-\pi/3$
17) $\arccos(0) =$ $\pi/2$
18) $\arctan(-\sqrt{3}/3) =$ $-\pi/6$

Finding Exact Values - "Double Problems": Generally do the inside first, but if you are not working with a special angle think about the triangle your ratio is in and remember your restrictions.

19) $\sin^{-1}[\sin(\pi/3)] =$ $\pi/3$
20) $\arccos\left[\cos\left(\frac{4\pi}{5}\right)\right] =$ $4\pi/5$

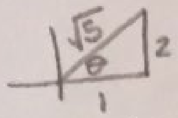
21) $\sin^{-1}\left(\tan\frac{3\pi}{4}\right) =$ $-\pi/2$
-1
22) $\cos\left[\arcsin\left(\frac{-1}{2}\right)\right] =$ $\sqrt{3}/2$

23) $\cos\left[\sin^{-1}\left(\frac{1}{2}\right)\right] =$ $\sqrt{3}/2$
24) $\sin[\tan^{-1}(1)] =$ $\sqrt{2}/2$

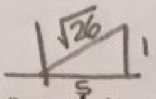


25) cos [arcsin (0.6)] = 4/5

$\frac{6}{10} = \frac{3}{5}$

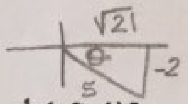


26) sin [arctan ($\frac{2}{1}$)] = $\frac{2\sqrt{5}}{5}$



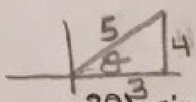
27) cos [$\tan^{-1}$ (0.2)] = $\frac{5\sqrt{26}}{26}$

$\frac{2}{10} = \frac{1}{5}$



28) tan [$\sin^{-1}$ (-0.4)] = $\frac{-2\sqrt{21}}{21}$

$-\frac{4}{10} = -\frac{2}{5}$



29) sin [$\cos^{-1}\left(\frac{3}{5}\right)$] = 4/5

30) $\cos^{-1}\left[\cos\left(-\frac{\pi}{5}\right)\right]$ = ______

31) $\arcsin\left[\sin\left(\frac{2\pi}{3}\right)\right]$ = π/3

$\sqrt{3}/2$

32) arctan (tan (2π/3)) −π/3

$-\sqrt{3}$

33) $\tan^{-1}$ (tan (4π/3)) π/3

$\sqrt{3}$

34) $\cos^{-1}\left[\cos\left(\frac{-\pi}{4}\right)\right]$ = π/4

$\sqrt{2}/2$

35) tan ($\sin^{-1}$ (1/2)) = $-\sqrt{3}/3$

−π/6

36) sin ($\sin^{-1}$ (0)) = 0

0

37) $\cos\left[\arcsin\left(\frac{-\sqrt{3}}{2}\right)\right]$ = 1/2

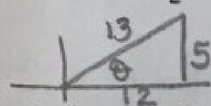
5π/3

38) $\tan\left[\arccos\left(\frac{-\sqrt{2}}{2}\right)\right]$ = −1

3π/4

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

π/2



40) sin (arctan (5/12)) = 5/13

41) arcsin (sin 5π/6)) = π/6

1/2

42) arcsin (cos 2π/3)) = −π/6

−1/2

(1/2, $-\sqrt{3}/2$)

~~43)~~ arcsin (cos -7π/3) = π/6

−π/3

44) arccos (sin 7π/6)= 2π/3

−1/2

45) sec (arccos (1/2))= 2

π/3

46) $\cos^{-1}$ (cot (7π/4)) = π

−1

Name: ______________________

Inverse Trig Functions

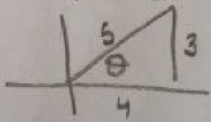
Find the EXACT value of the inverse trig function without using a calculator. The answers should be in radians.

odd

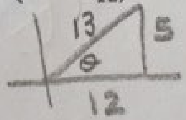
1. $\arcsin\left(\frac{1}{2}\right)$ = $\pi/6$
2. $\cos^{-1}(0)$ $\pi/2$
3. $\arctan(1)$ $\pi/4$
4. $\sin^{-1}\left(\frac{-\sqrt{3}}{2}\right)$ = $-\pi/3$
5. $\arccos(-1)$ = π
6. $\tan^{-1}(-1)$ = $-\pi/4$
7. $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$ $\pi/3$
8. $\arccos(1)$ = 0
9. $\arctan(-\sqrt{3})$ $-\pi/3$
10. $\arcsin\left(-\frac{1}{2}\right)$ $-\pi/3$
11. $\cos^{-1}\left(\frac{-\sqrt{2}}{2}\right)$ = $3\pi/4$
12. $\arctan(\sqrt{3})$ $\pi/3$
13. $\sec^{-1}(2)$ = $\pi/3$
    $\cos^{-1}(1/2)$
14. $\operatorname{arccsc}(\sqrt{2})$ = $\pi/4$
    $\arcsin\left(\frac{\sqrt{2}}{2}\right)$
15. $\operatorname{arccot}(-1)$ = $-\pi/4$
    $\arctan(-1)$
16. $\operatorname{arcsec}(-\sqrt{2})$
    $\arccos\left(-\frac{\sqrt{2}}{2}\right)$ $3\pi/4$
17. $\csc^{-1}(-1)$ = $-\pi/2$
    $\sin^{-1}(-1)$
18. $\sec^{-1}\left(\frac{2\sqrt{3}}{3}\right)$ = $\pi/6$
    $\cos^{-1}\left(\frac{3}{2\sqrt{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}}\right) = \frac{3\sqrt{3}}{6} = \frac{\sqrt{3}}{2}$

Find the exact value of the composition (hint: draw a triangle in the correct quadrant if values are not on the unit circle).

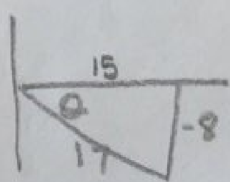
19. $\tan\left(\sin^{-1}\frac{-\sqrt{2}}{2}\right)$ = -1
    $-\pi/4$
20. $\cot(\cos^{-1} 0)$ = 0
    $\pi/2$
21. $\sec(\sin^{-1} 0.5)$ = 2
    $\pi/3$
22. $\tan\left(\cos^{-1}\frac{4}{5}\right)$ = $3/4$



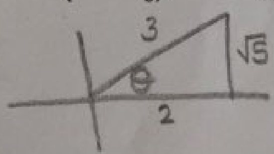
23. $\sin\left(\tan^{-1}\frac{5}{12}\right)$ = $5/13$



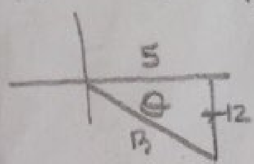
24. $\cos\left(\sin^{-1} -\frac{8}{17}\right)$ = $\frac{15}{17}$



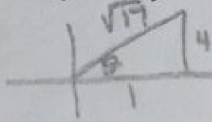
25. $\sec\left(\cos^{-1}\frac{2}{3}\right)$ = $3/2$



26. $\cot\left(\csc^{-1} -\frac{13}{12}\right)$ = $5/12$



27. $\sin(\cot^{-1} 4)$ = $\frac{4}{\sqrt{17}}$ = $\frac{4\sqrt{17}}{17}$



EVALUATIONS...use the unit circle visuals to help you

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

$\sin^{-1}(-1) \quad -\pi/2$

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

$\arctan\left(\frac{\sqrt{3}}{3}\right) = \pi/6$

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

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

$\sin^{-1}\frac{-1}{2} = -\pi/6$

$\arccos(-1) = \pi$

Careful...

arcsinπ

DOUBLE EVALUATIONS...don't

assume that inverses will just "cancel out", there are domain & range restrictions

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

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

$\arccos\left(\underbrace{\cos\frac{7\pi}{6}}_{-\sqrt{3}/2}\right) = \frac{5\pi}{6}$

$\arctan\left(\tan\frac{3\pi}{4}\right)$

$\cos^{-1}\left(\underbrace{\sin\frac{2\pi}{3}}_{\sqrt{3}/2}\right) = \pi/6$

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

$\cos\left(\underbrace{\arcsin\left(\frac{-\sqrt{3}}{2}\right)}_{1/2}\right) = -\pi/3$

$\sin\left(\arctan\left(\frac{1}{2}\right)\right)$