

Pre-Calculus
Unit 4 Review

Name: _____

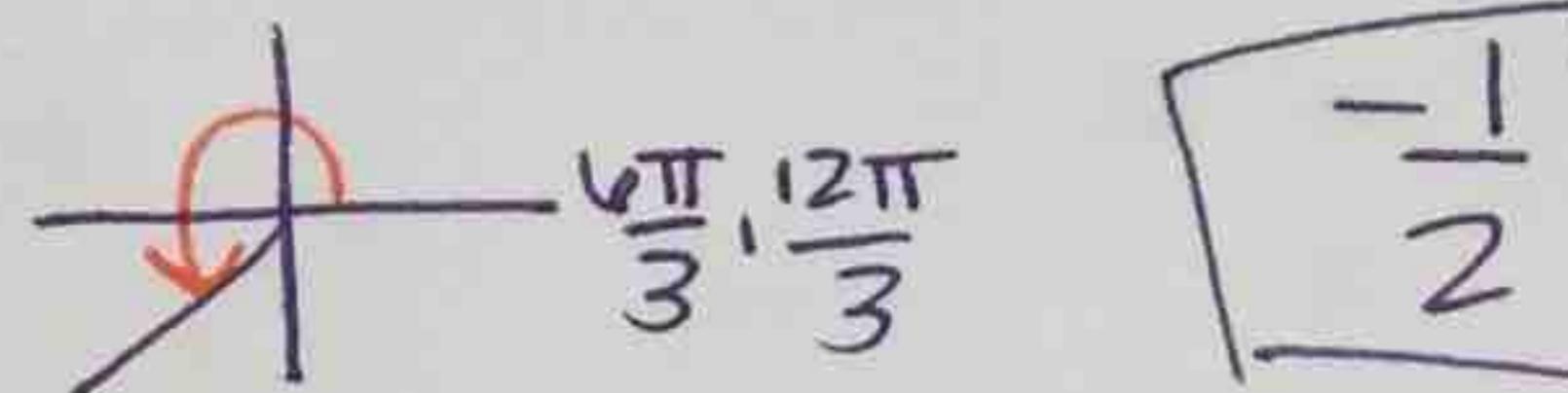
Simplify the following expressions using exact values.

1. $\sin\left(-\frac{5\pi}{4}\right)$ coterminal to $\frac{3\pi}{4}$



$$\boxed{\frac{\sqrt{2}}{2} \text{ OR } \frac{1}{\sqrt{2}}}$$

2. $\cos\left(\frac{10\pi}{3}\right)$ coterminal to $\frac{4\pi}{3}$



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

3. $(\sin\frac{\pi}{2})(\cos\pi) + (\cos\frac{\pi}{2})(\sin\pi)$

$$(1)(-1) + (0)(0)$$

$$\boxed{-1}$$

$$\frac{\sin\frac{\pi}{3}}{\cos\frac{5\pi}{3}}$$

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

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

$$\boxed{\sqrt{3}}$$

5. $\cos^2\left(\frac{11\pi}{6}\right) + \sin^2\left(\frac{\pi}{4}\right)$

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

$$\frac{3}{4} + \frac{1}{2}$$

$$\frac{3}{4} + \frac{2}{4} = \boxed{\frac{5}{4}}$$

Find the inverse value(s) between 0 and 360 degrees. ($\cos\theta, \sin\theta$)

6. $\theta = \arccos\left(\frac{1}{2}\right)$ $x = \frac{1}{2}$

60° and 300°

7. $\sin\theta = (-1)$ $y = -1$

$$\theta = \sin^{-1}(-1)$$

270°

8. $\theta = \cos^{-1}(0)$ $x = 0$

90° and 270°

9. $\theta = \cot^{-1}(-\sqrt{3})$

$$\frac{x}{y} = \frac{-\frac{\sqrt{3}}{2}}{\frac{1}{2}} \quad 150^\circ \text{ and } 330^\circ$$

10. $\theta = \arccos\left(-\frac{\sqrt{2}}{2}\right)$

135° and 225°

11. $\tan\theta = (0)$

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

$\frac{y}{x} = 0 \quad 0^\circ \text{ and } 180^\circ$

Find the inverse value(s) between 0 and 2π

10. $x = \arccos\left(\frac{1}{\sqrt{2}}\right)$ x

$$\frac{\pi}{4}, \frac{7\pi}{4}$$

11. $x = \sin^{-1}(1)$ y

$$\frac{\pi}{2}$$

12. $x = \csc^{-1}(-1)$

$$\frac{1}{\sin}$$

$$\boxed{\frac{3\pi}{2}}$$

13. $x = \cot^{-1}(-1)$

$$\frac{x}{y} \quad \begin{matrix} \sin \text{ & } \\ \cos \text{ same } \\ \text{wl diff. signs} \end{matrix}$$

$$\boxed{\frac{3\pi}{4} \text{ and } \frac{7\pi}{4}}$$

14. $x = \arccos\left(-\frac{\sqrt{3}}{2}\right)$ x

$$\boxed{\frac{5\pi}{6}, \frac{7\pi}{6}}$$

15. $\sec x = (2)$

$$x = \sec^{-1}(2)$$

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

$$\boxed{\frac{\pi}{3}, \frac{5\pi}{3}}$$

where does

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

16. List the restricted ranges for each of the inverse parent functions.

$$\sin^{-1}(x) \rightarrow [-\frac{\pi}{2}, \frac{\pi}{2}]$$

$$\csc^{-1}(x) \rightarrow [-\frac{\pi}{2}, \frac{\pi}{2}] \quad \tan^{-1}(x) \rightarrow (-\frac{\pi}{2}, \frac{\pi}{2})$$

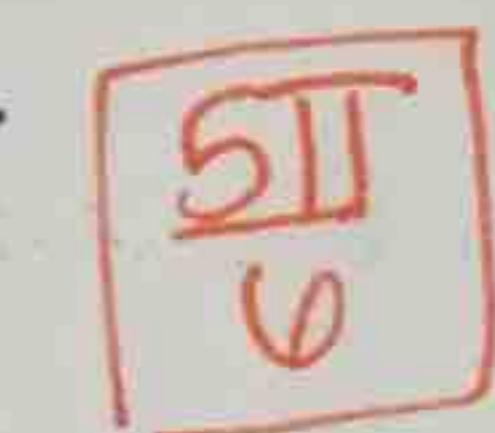
$$\cos^{-1}(x) \rightarrow [0, \pi]$$

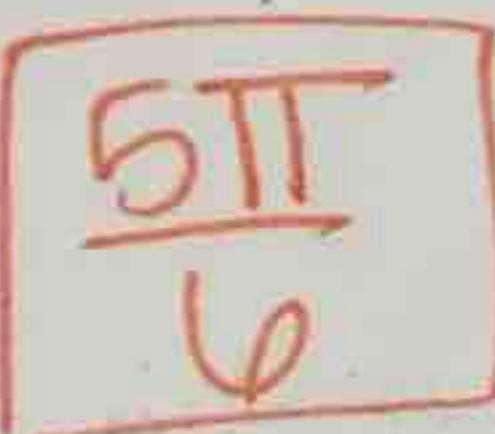
$$\sec^{-1}(x) \rightarrow [0, \pi]$$

$$\cot^{-1}(x) \rightarrow (0, \pi)$$

NO Quadrant III

Find the exact principal value in radians:

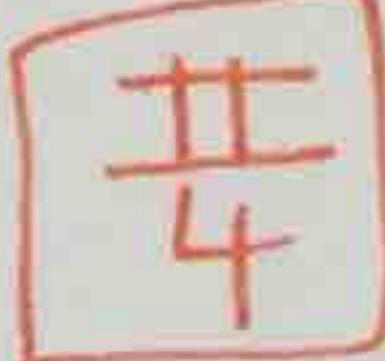
17. $\sec^{-1}\left(-\frac{2}{\sqrt{3}}\right)$ II
flip x 

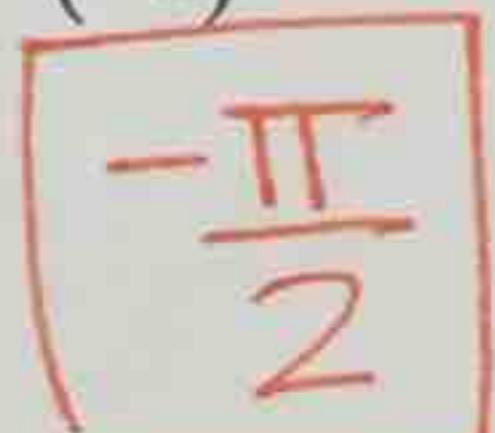
20. $\cot^{-1}(-\sqrt{3})$ II
 $\frac{x}{y}$ 

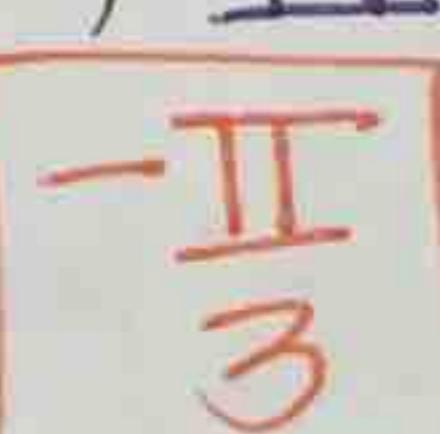
23. $\sin^{-1}\left(\frac{1}{2}\right)$ I
Y 

26. $\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)$ IV
Y 

~~cot sec~~ | + ALL
- cos |
X - sin CSC } - ref <
tan }
X

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

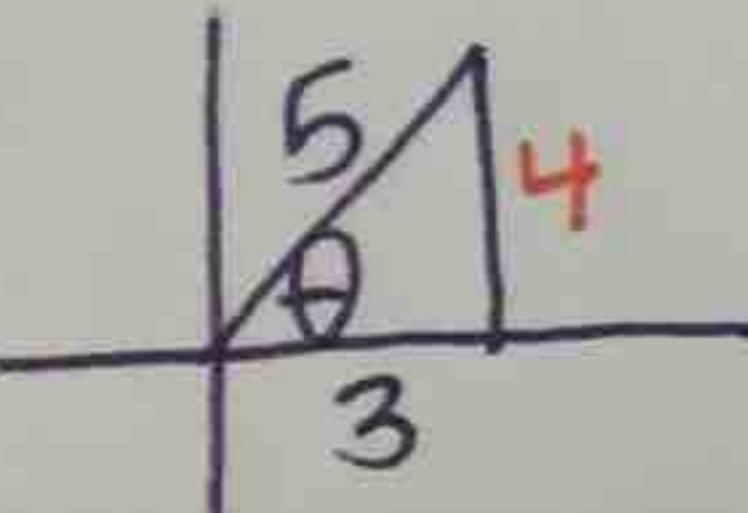
21. $\sin^{-1}(-1)$
Y 

24. $\tan^{-1}(-\sqrt{3})$ IV
Y X 

27. $\sec^{-1}\left(\frac{2}{\sqrt{3}}\right)$ I
flip x 

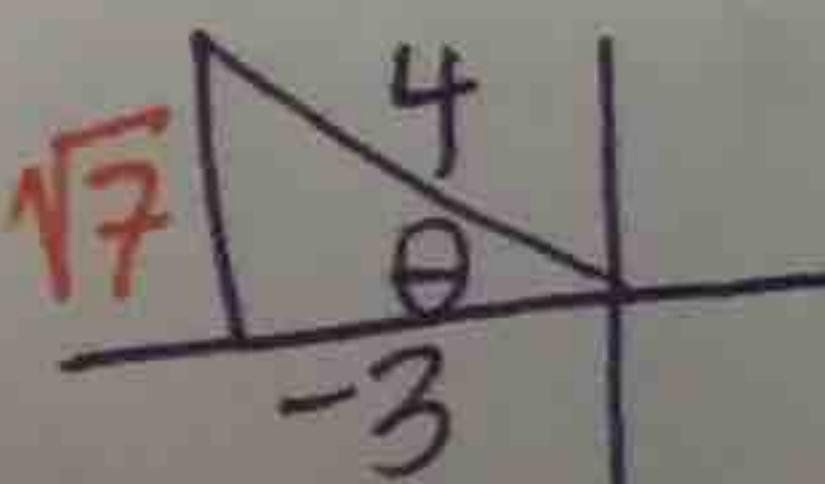
Find the exact value of the expression using radians and radicals if necessary.

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



$\cot \theta = \frac{3}{4}$

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



$y^2 + (-3)^2 = 42$

$\sin \theta = \frac{\sqrt{17}}{4}$

Angle 35. $\csc^{-1}\left(\sec\left(\frac{2\pi}{3}\right)\right)$

$\sec \frac{2\pi}{3} = -2$

$\csc^{-1}(-2) = \frac{-\pi}{6}$

Angle 30. $\sec^{-1}\left(\sec\left(\frac{7\pi}{6}\right)\right)$

$\sec\left(\frac{7\pi}{6}\right) = -\frac{2}{\sqrt{3}}$
flip x @ $\frac{7\pi}{6}$

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

Angle 33. $\sin^{-1}\left(\cos\left(\frac{5\pi}{6}\right)\right)$

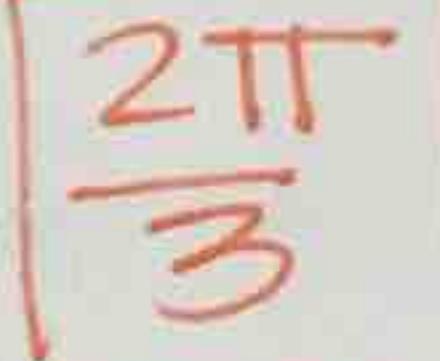
$\cos\left(\frac{5\pi}{6}\right) = -\frac{\sqrt{3}}{2}$

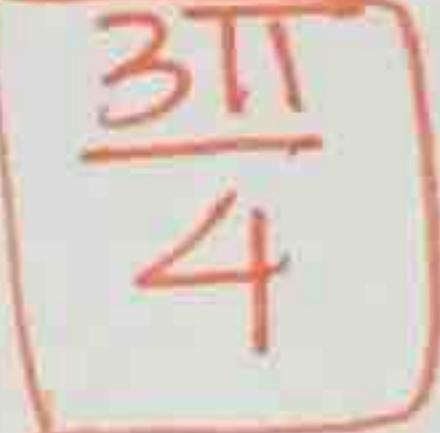
$\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right) = -\frac{\pi}{3}$
QIV
 $y = -\frac{\sqrt{3}}{2}$

19. $\sin^{-1}\left(-\frac{1}{\sqrt{2}}\right)$ IV

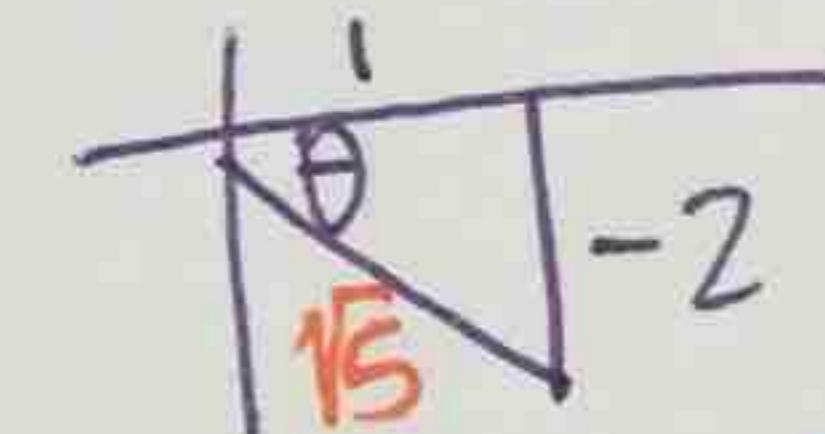
Y 

22. $\cos^{-1}(0)$
X 

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

28. $\cot^{-1}(-1)$ II
X 

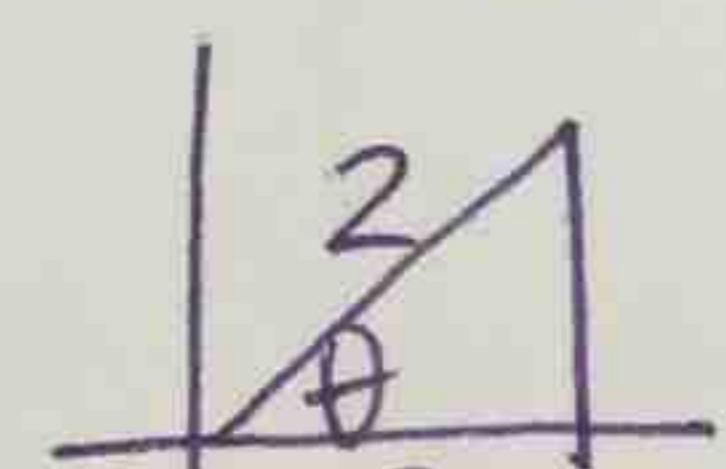
31. $\csc\left(\tan^{-1}\left(-\frac{2}{1}\right)\right)$



$(-2)^2 + 1^2 = c^2$

$\csc \theta = \frac{\sqrt{5}}{-2}$

34. $\cot\left(\sec^{-1}\left(\frac{2}{3}\right)\right)$



$3^2 + y^2 = 22$
 $y^2 = -5$
DNE