-90 to 90

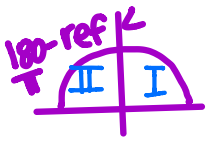
$-\frac{\pi}{2}, \frac{\pi}{2}$

sin
csc
tan

0 to 180

$0, \pi$

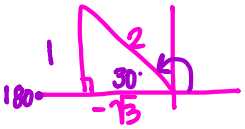
cos
sec
cot



4.3 Principal Inverse Values

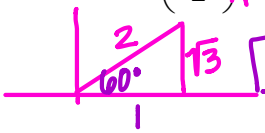
Find the exact principal value in degrees:

1. $\theta = \cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$ A/H QII



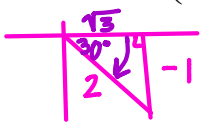
$\boxed{150°}$

2. $\theta = \sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$ O/H QI



$\boxed{60°}$

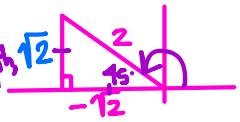
3. $\theta = \arcsin\left(-\frac{1}{2}\right)$ O/H QIV



$\boxed{-30°}$

4. $\theta = \cos^{-1}\left(-\frac{\sqrt{2}}{2}\right)$ A/H QII

legs are same length, 45-45-90



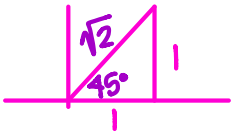
$\boxed{135°}$

$(-\sqrt{2})^2 + y^2 = 2^2$

$2 + y^2 = 4$

$y^2 = 2$

5. $\theta = \arctan(1)$ O/A QI



$\boxed{45°}$

6. $\theta = \arcsin(1)$ on axis

Angle where sine = 1 (y)

$\boxed{90°}$

7. $\theta = \cos^{-1}(-1)$ on axis

$\boxed{180°}$

8. $\theta = \sin^{-1}(0)$ on axis

$\boxed{0°}$

9. $\theta = \tan^{-1}(-1)$ QIV

$\boxed{-90°}$

10. $\theta = \arccos\left(\frac{1}{2}\right)$ QI

$\boxed{60°}$

11. $\theta = \arcsin(-1)$ on axis

$\boxed{-90°}$

12. $\theta = \cos^{-1}(0)$ on axis

$\boxed{90°}$

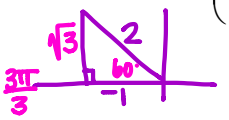
Find the exact principle value in radians:

13. $x = \cot^{-1}\left(\frac{-\sqrt{3}}{1}\right)$ $\frac{A}{O}$ QII

$30° = \frac{\pi}{6}$

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

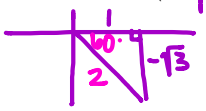
14. $x = \arccos\left(-\frac{1}{2}\right)$ QII



$60° = \frac{\pi}{3}$

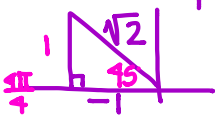
$\boxed{\frac{2\pi}{3}}$

15. $x = \tan^{-1}\left(\frac{-\sqrt{3}}{1}\right)$ QIV



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

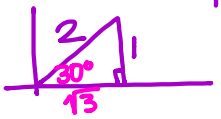
16. $x = \sec^{-1}\left(\frac{-\sqrt{2}}{1}\right)$ $\frac{H}{A}$ QII



$45° = \frac{\pi}{4}$

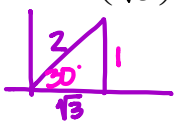
$\boxed{\frac{3\pi}{4}}$

17. $x = \operatorname{arccsc}\left(\frac{2}{1}\right)$ $\frac{H}{O}$ QI



$\boxed{\frac{\pi}{6}}$

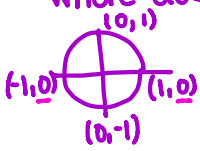
18. $x = \sec^{-1}\left(\frac{2}{\sqrt{3}}\right)$ $\frac{H}{A}$ QI



$\boxed{\frac{\pi}{6}}$

19. $x = \sin^{-1}(0)$ on axis

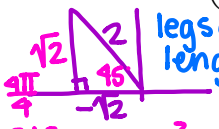
where does $y = 0$?



$\boxed{0}$

π is not in restricted range

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



legs are same length → 45-45-90

$(-\sqrt{2})^2 + y^2 = 2^2$

$2 + y^2 = 4$

$y^2 = 2$

$\boxed{\frac{3\pi}{4}}$

21. $x = \sin^{-1}\left(-\frac{\sqrt{2}}{2}\right)$ QIV

$\boxed{-\frac{\pi}{4}}$

22. $x = \sec^{-1}(-1)$ on axis

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

where does $\cos(x) = -1$?

$\boxed{\pi}$

23. $x = \tan^{-1}(0)$ on axis

$\boxed{0}$

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

$\cot\theta = \frac{1}{\tan\theta}$

where does $\tan\left(\frac{y}{x}\right) = -1$?

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

25. $x = \sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)$ QIV

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

26. $x = \operatorname{arcsec}(-2)$ QII

$\boxed{\frac{3\pi}{4}}$

27. $x = \csc^{-1}(-1)$ on axis

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

28. $x = \cot^{-1}(-\sqrt{3})$ QII

see #13

29. $x = \sin^{-1}(2)$ $\frac{O}{H}$

not possible

$x^2 + 2^2 = 1^2$

$x^2 = -3$

??

$\boxed{\text{DNE}}$

30. $x = \operatorname{arcsec}\left(\frac{1}{2}\right)$ $\frac{H}{A}$

not possible

$\boxed{\text{DNE}}$

hypotenuse should be longest side!