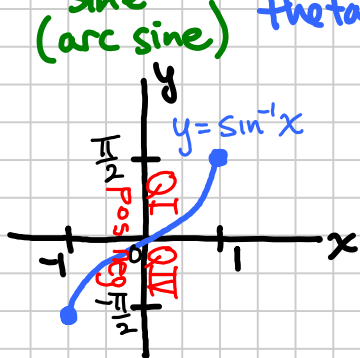


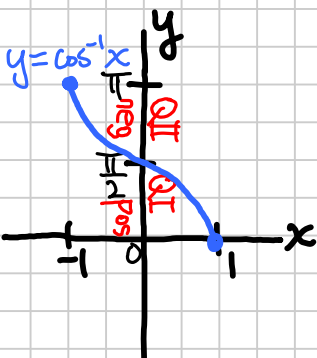
10/15 MON

4.7 (part 2) Inverse Trig Functions

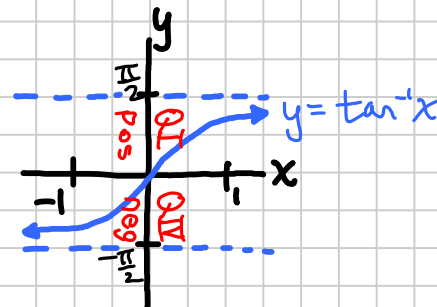
Recap: $\sin^{-1} \neq \frac{1}{\sin \theta} = \csc \theta$
 Inverse Sine (arc sine) θ theta
 reciprocal



Domain: $[-1, 1]$
 Range: $[-\frac{\pi}{2}, \frac{\pi}{2}]$
 QI, QIV



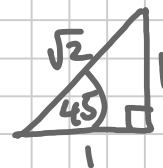
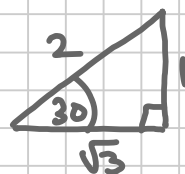
Domain: $[-1, 1]$
 Range: $[0, \pi]$
 QI, QII



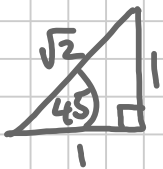
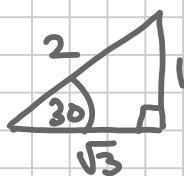
Domain: $(-\infty, \infty)$
 Range: $(-\frac{\pi}{2}, \frac{\pi}{2})$
 QI, QIV

ex 1) Find the exact of $\sin^{-1} \frac{\sqrt{2}}{2}$.

Let $\theta = \sin^{-1} \frac{\sqrt{2}}{2}$
 angle $\sin \theta = \frac{\sqrt{2}}{2}$
 $\theta = \frac{\pi}{4}$



ex 2) Find the exact value of $\sin^{-1}(-\frac{1}{2})$.



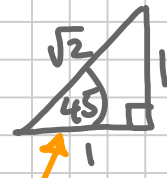
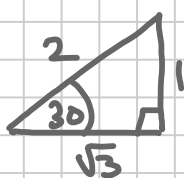
Let $\theta = \sin^{-1}(-\frac{1}{2})$
 $\sin \theta = -\frac{1}{2}$

$\theta = \frac{\pi}{6}$ in QIV
 $\theta = -\frac{\pi}{6}$ 30°



Checkpoint → ... $\sin^{-1}(-\frac{\sqrt{2}}{2})$

$\sin \theta = -\frac{\sqrt{2}}{2}$
 $\theta = \frac{\pi}{4}$ in QIV
 $\theta = -\frac{\pi}{4}$



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

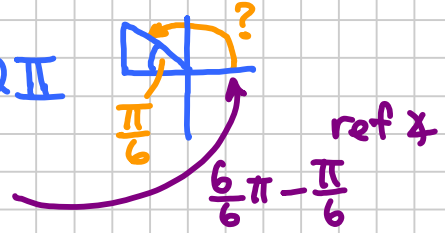


$$\theta = \cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$$

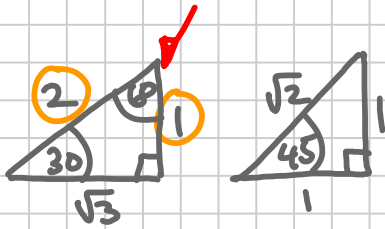
$$\cos \theta = -\frac{\sqrt{3}}{2}$$

$$\theta = \frac{\pi}{6} \text{ in Q II}$$

$$\theta = \frac{5\pi}{6}$$

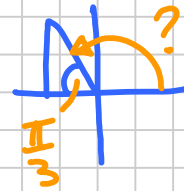


Checkpoint $\cos^{-1}\left(-\frac{1}{2}\right)$.



$$\theta = \frac{\pi}{3} \text{ in Q II}$$

$$\theta = \frac{2\pi}{3}$$



ex 4) $\tan^{-1} \sqrt{3}$.



$$\theta = \frac{\pi}{3} \text{ Q I}$$

Checkpoint

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

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



ex 5) Use a calc... (4 decimal)

a) $\sin^{-1}\left(\frac{1}{4}\right) \approx 0.2527$
parentheses radian

b) $\tan^{-1}(-9.65) \approx -1.4675$
radian

Composition of Functions

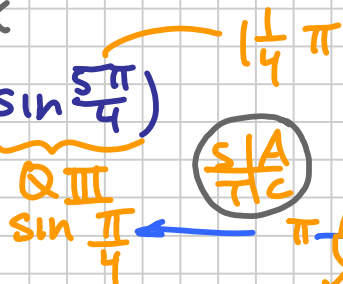
$$f(f^{-1}(x)) = x \text{ and } f^{-1}(f(x)) = x$$

\sin^{-1} : pos neg
Q I, Q IV

\cos^{-1} : Q I, Q II

\tan^{-1} : Q I, Q IV

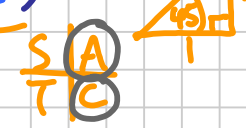
ex) $\sin^{-1}\left(\sin \frac{5\pi}{4}\right)$



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

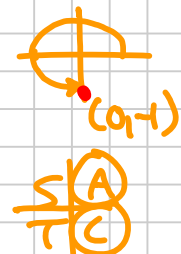
Q IV

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



ex 6) a) $\cos(\cos^{-1} 0.6) = 0.6$

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



$\sin^{-1}(-1)$
 $\theta = -\frac{\pi}{2}$

Hint
 Check
 w/GC

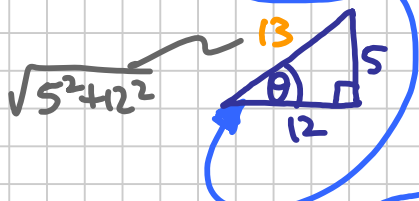


c) $\cos(\cos^{-1} 1.5) = \text{error}$

ex 7) ... $\cos(\tan^{-1} \frac{5}{12})$

• pos ratio: QI

SOH CAH TOA

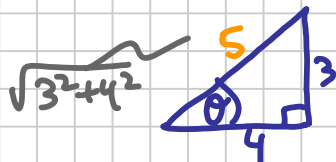


... $\cos(\theta) = \frac{12}{13}$

Checkpoint: ... $\sin(\tan^{-1} \frac{3}{4})$

• pos ratio: QI

SOH CAH TOA



ex 8) $\cot[\sin^{-1}(-\frac{1}{3})]$

neg ratio: QIV

SOH CAH TOA



$\sqrt{3^2 - (-1)^2} = \sqrt{8} = 2\sqrt{2}$

$\cot \theta = \frac{\text{adj}}{\text{opp}} = \frac{2\sqrt{2}}{-1} = -2\sqrt{2}$

hw
 p. 563 #2-62 EOE