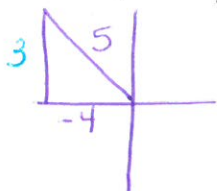


Chapter 4 Extra Practice

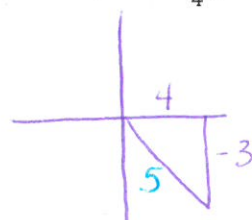
* Make sure your calculator is in the correct mode.

Calculate the exact value of the inverse function geometrically by drawing a picture. Assume the principal branch in all cases.

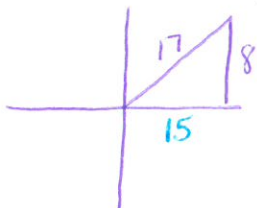
1. $\tan(\cos^{-1} \frac{-4}{5}) = \boxed{-\frac{3}{4}}$



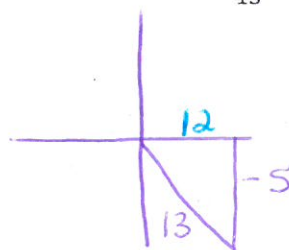
2. $\sin(\tan^{-1} \frac{-3}{4}) = \boxed{-\frac{3}{5}}$



3. $\cos(\sin^{-1} \frac{8}{17}) = \boxed{\frac{15}{17}}$



4. $\sec(\sin^{-1} \frac{-5}{13}) = \boxed{\frac{13}{12}}$



Solve algebraically.

5. $\tan^2 \theta = 2 \tan \theta \quad \theta \in [0, 360^\circ]$

$\tan^2 \theta - 2 \tan \theta = 0$

$\tan \theta (\tan \theta - 2) = 0$

$\boxed{0^\circ, 63.43^\circ, 180^\circ, 243.43^\circ, 360^\circ}$

$\tan \theta = 0$

$\theta = \tan^{-1}(0) + 180n$

$0^\circ, 180^\circ, 360^\circ$

$\tan \theta - 2 = 0$

$\tan \theta = 2$

$\theta = 63.43^\circ + 180n$

$63.43^\circ, 243.43^\circ, 423.43^\circ$

6. $4 \sin(x-3) = 1 \quad x \in [0, 4\pi]$

$\sin(x-3) = \frac{1}{4}$

$x-3 = \arcsin(\frac{1}{4})$

$\begin{cases} x = 3 + \sin^{-1}(\frac{1}{4}) + 2\pi n \\ x = 3 + [\pi - \sin^{-1}(\frac{1}{4})] + 2\pi n \end{cases}$

$\begin{cases} x = 3 + 0.253 + 2\pi n \\ x = 3 + 2.889 + 2\pi n \end{cases}$

$\begin{cases} x = 3 + 0.253 + 2\pi n \\ x = 3 + 2.889 + 2\pi n \end{cases}$

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$\begin{cases} x = 3.253 + 2\pi n \\ x = 5.889 + 2\pi n \end{cases}$

$\begin{cases} x = 3.253 + 2\pi n \\ x = 5.889 + 2\pi n \end{cases}$

$\boxed{3.253 \quad 5.889}$
 $\boxed{9.536 \quad 12.172}$

$\boxed{15.819 \quad 18.455}$

7. $0 = 2 \cos^2 \theta - 3 \cos \theta + 1 \quad \theta \in [0, 720^\circ]$

$0 = (2 \cos \theta - 1)(\cos \theta - 1)$

$2 \cos \theta - 1 = 0$

$60^\circ, 420^\circ, 780^\circ$

$2 \cos \theta = 1$

$-60^\circ, 300^\circ, 660^\circ$

$\cos \theta = \frac{1}{2}$

$\theta = \pm \cos^{-1}(\frac{1}{2}) + 360n$

$\boxed{60^\circ, 300^\circ, 420^\circ, 660^\circ}$

$\cos \theta - 1 = 0$

$\cos \theta = 1$

$\theta = \pm \cos^{-1}(1) + 360n$

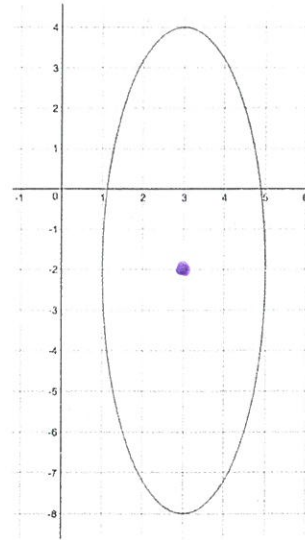
$\theta = \pm 0 + 360n$

$\boxed{0^\circ, 360^\circ, 720^\circ}$

$\theta = \pm 60^\circ + 360n$

8. Write parametric equations for this ellipse.

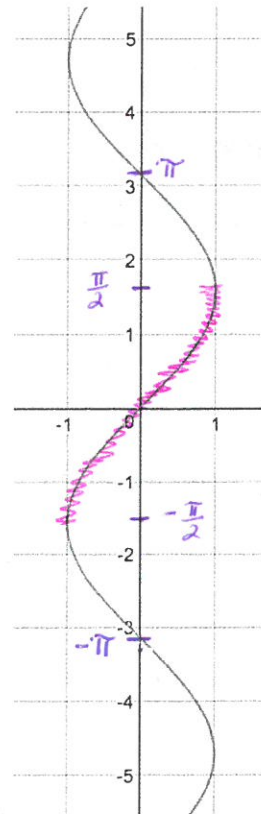
$$\begin{aligned} x &= 3 + 2 \cos T \\ y &= -2 + 6 \sin T \end{aligned}$$



9. This shows $y = \arcsin x$

- a) Shade $y = \sin^{-1} x$ (principal branch)
 b) Give the range of $y = \sin^{-1} x$

$$\left[-\frac{\pi}{2}, \frac{\pi}{2}\right] \text{ or } [-90^\circ, 90^\circ]$$



10. Write parametric equations you would put in your calculator to graph $y = \arccos x$

Regular

$$\begin{aligned} x &= T \\ y &= \cos T \end{aligned}$$

Inverse:

$$\begin{aligned} x &= \cos T \\ y &= T \end{aligned}$$

11. Eliminate the parameter T

$$\begin{aligned} x &= -3 + 2 \cos T & \left(\frac{x+3}{2}\right)^2 &= (\cos T)^2 \\ y &= 1 + 4 \sin T & + \left(\frac{y-1}{4}\right)^2 &= (\sin T)^2 \end{aligned}$$

$$\left(\frac{x+3}{2}\right)^2 + \left(\frac{y-1}{4}\right)^2 = 1$$