Part 2

You must SHOW ALL OF YOUR WORK to receive credit. Please use box each final answer.

6. Answer to (a) – (e). (5 pts each)

(a) Find the **reference angle** of -123°.

(a) $\boxed{57^\circ}$.

$180^\circ - 123^\circ = 57^\circ$

(b) Find the **phase shift** of $y = 3 + 3\cos(3x + \pi)$.

(b) $\boxed{-\frac{\pi}{3}}$.

$y = 3 + 3\cos\left[3\left(x + \frac{\pi}{3}\right)\right]$

(c) Find the **period** of $y = -6\cot\left(\frac{\pi x}{4}\right)$.

(c) $\boxed{4}$.

$\text{period} = \frac{\pi}{\frac{\pi}{4}} = 4$

(d) Find the **exact value** of $\tan\left(arc\tan\left(\frac{\pi}{7}\right)\right)$.

(d) $\boxed{\frac{\pi}{7}}$.

Since $y = \tan x$ and $y = \arctan x$ are inverse of each other,

$\tan(\arctan x) = x$ and $\tan\left(\arctan\left(\frac{\pi}{7}\right)\right) = \frac{\pi}{7}$

Also $-\frac{\pi}{2} < \tan x < \frac{\pi}{2}$ and $-\frac{\pi}{2} < \frac{\pi}{7} < \frac{\pi}{2}$

(e) Find the **exact value** of $\sin\left(\tan^{-1}(-1)\right)$.

(e) $\boxed{-\frac{\sqrt{2}}{2}}$.

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

Then $\tan\theta = -1 \Rightarrow \theta = -\frac{\pi}{4}$

$\sin\left(-\frac{\pi}{4}\right) = -\frac{\sqrt{2}}{2}$

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