



parent: $y = \cos x \longrightarrow y = a \cos[k(x-p)] + q$

Axis of the curve: $y = \frac{\text{max} + \text{min}}{2}$
 $= \frac{4 + (-2)}{2}$

$y = 1 \longrightarrow q = 1. \checkmark$

Amplitude = 3 $\longrightarrow |a| = 3$

Period = $180^\circ \longrightarrow \text{period} = \frac{360^\circ}{k}$ ← period of parent function

* always set k to be positive

$180^\circ = \frac{360^\circ}{k}$

$180^\circ k = 360^\circ$

$k = 2 \checkmark$

Phase Shift = $+135^\circ \longrightarrow p = 135^\circ$
 (no v. reflect) $\longrightarrow a = 3$

$y = 3 \cos[2(x - 135^\circ)] + 1 \checkmark$

$$\begin{array}{l} \text{Phase Shift} = +45^\circ \longrightarrow p = 45^\circ \\ \text{(v. reflection)} \longrightarrow a = -3 \end{array}$$

$$y = \underline{-3} \cos \left[\underline{2} (x - \underline{45^\circ}) \right] + \underline{1} \quad \checkmark$$

$$\begin{array}{l} \text{Phase Shift} = -45^\circ \longrightarrow p = -45^\circ \\ \text{(no v. reflection)} \longrightarrow a = 3 \end{array} \quad \begin{array}{l} x - p \\ = x - (-45^\circ) \\ = x + 45^\circ \end{array}$$

$$y = \underline{3} \cos \left[\underline{2} (x + \underline{45^\circ}) \right] + \underline{1} \quad \checkmark$$

* all 3 equations are valid !!