Translations of Sinusoidal Functions

$$\boldsymbol{f(x) = asin[k(x - d)] + c} \textit{ and } \boldsymbol{f(x) = acos[k(x - d)] + c}$$

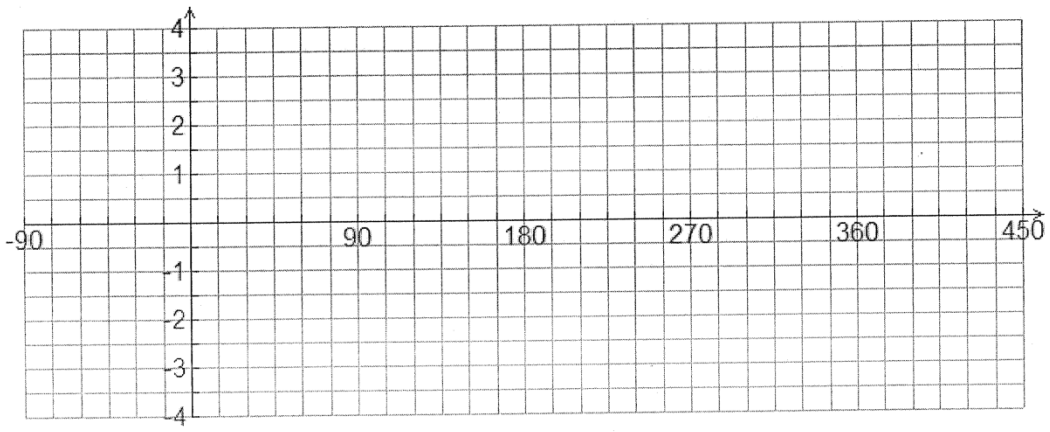
Part A: Horizontal Translations/ Shifts

Recall: x says something yet does the exact opposite**.**

The graph of $y = f(x + d)$ is obtained from the graph of $y = f(x)$ translated _____.
The graph of $y = f(x - d)$ is obtained from the graph of $y = f(x)$ translated _____.

Example: Refer to $y = \sin(\theta + 30°)$ for the questions that follow.

1. Use mapping notation to graph the function below.



2. State its period and amplitude.

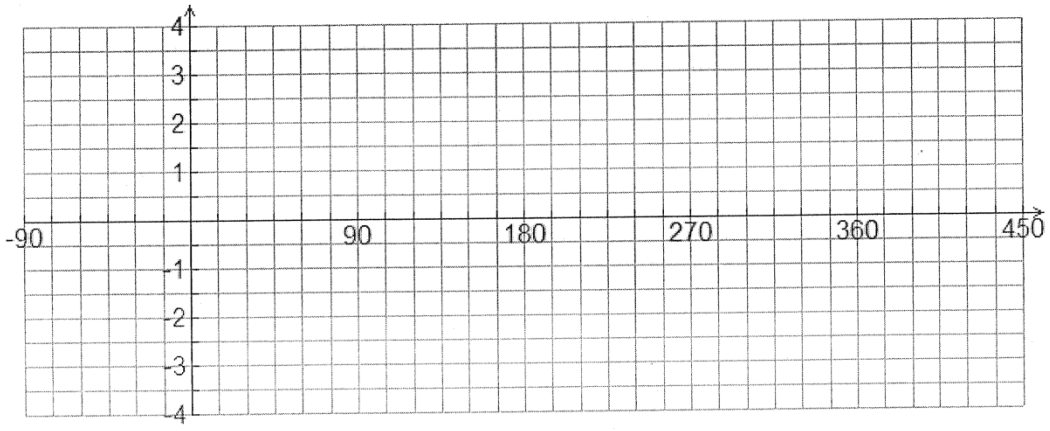
3. State the domain and range of the transformed function.

Part B: Vertical Translations/ Shifts

The graph of $y = f(x) + c$ is obtained from the graph of $y = f(x)$ translated _____.
The graph of $y = f(x) - c$ is obtained from the graph of $y = f(x)$ translated _____.

Example: Refer to $y = \cos\theta + 3$ for the equations that follow.

1. Use mapping notation to graph the function below.

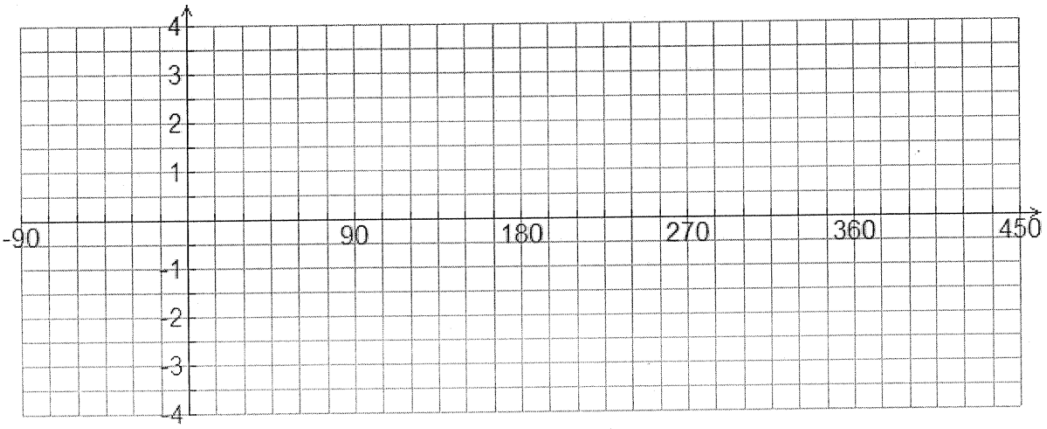


2. State its period and amplitude.

3. State the domain and range of the transformed function.

Let's Put it All Together!

Ex1: Graph $y = 2\sin(\theta + 45°) - 1$ using mapping notation. Then, state its amplitude, period and equation of the axis of the curve.



Ex2: Graph $y = 3\cos(2\theta - 120°) + 1$ using mapping notation. Then, state its amplitude, period and equation of the axis of the curve.