5-5-14

$$y = a \sin(bx + c)$$

↑ amplitude   ↑ period helper   ↑ phase shift

① $y = 3 \sin(2\theta)$
            b

Amplitude = 3

period = $\dfrac{360}{b} = \dfrac{360}{2} = 180°$

phase shift → None

Phase shift = $\dfrac{-c}{b}$

② $y = 4 \sin(2\theta + 10)$

Amp = 4

period = $\dfrac{360}{b} = \dfrac{360}{2} = 180°$

phase shift = $\dfrac{-c}{b} = \dfrac{-10}{2} = -5$

— move left

+ moved right

1

③ $y = 2 \cos\left(\dfrac{3}{b}\theta - 30°\right)$

$Amp = 2$

$Period = \dfrac{360}{3} = 120°$

$Phase\ Shift = \dfrac{-c}{b} = \dfrac{30}{3} = 10°$

(right)

Give equation of sin
function with

$amp = 6$

$period = 180°$

$phase\ shift = +2\ (right)$

$$y = \underline{6} \sin\left(\dfrac{2}{b}\theta - 4\right)$$

$period = \dfrac{360}{b}$

$\downarrow$

$\underline{180°} = \dfrac{360}{b}$

$b = 2$

$phase\ shift = \dfrac{-c}{b}$

$\dfrac{2}{1} = \dfrac{-c}{2}$

$-c = 4$

$\therefore c = -4$

Amp = 8

Period = 90°

Phase Shift = +20° right

$$y = 8 \sin(\underline{4}\theta - 80)$$

Period $= \frac{360}{b}$

$$\frac{90}{1} = \frac{360}{b}$$

$$90b = 360$$

$$b = 4$$

Phase $S = \frac{-C}{b}$

$$\frac{20}{1} = \frac{-C}{4}$$

$$-C = 80$$

$$C = -80$$

Amp = 2

Period = 720°

Phase shift = 8°

$$y = 2 \sin\left(\tfrac{1}{2}\theta - 4\right)$$

Period $= \frac{360}{b}$

$$\frac{720}{1} = \frac{360}{b}$$

$$\frac{720b}{720} = \frac{360}{720}$$

$$b = \tfrac{1}{2}$$

Ph. Sh $= \frac{-C}{b}$

$$\frac{8°}{1} = \frac{-C}{\tfrac{1}{2}}$$

$$-C = 4$$

$$C = -4$$

Amp = 6

Period = 1440°

Phase Shift = 12°

$$y = 6 \sin\left(\tfrac{1}{4}\theta - 3\right)$$

$$\frac{Period}{1} = \frac{360}{b} \qquad P.S. = \frac{-c}{b}$$

$$\frac{1440}{1} = \frac{360}{b} \qquad \frac{12°}{1} = \frac{-c}{\tfrac{1}{4}}$$

$$\frac{1440b}{1440} = \frac{360}{1440} \qquad -c = 3$$

$$c = -3$$

$$b = \tfrac{1}{4}$$

Amp = 1

Period = 1080°

P.S. = 6°

$$y = \sin\left(\tfrac{1}{3}\theta - 2\right)$$

$$period = \frac{360}{b} \qquad P.S. = \frac{-c}{b}$$

$$\frac{1080}{1} = \frac{360}{b} \qquad \frac{6°}{1} = \frac{-c}{\tfrac{1}{3}}$$

$$\frac{1080b}{1080} = \frac{360}{1080} \qquad -c = 2$$

$$c = -2$$

$$b = \tfrac{1}{3}$$

$$y = a \sin(b\theta)$$

↑ determines
period

$$y = a \sin(b\theta + c)$$

↑ phase
shift

① $y = 3 \sin\left(\dfrac{4\theta}{b}\right)$

Amp = 3

Period = $\dfrac{360}{b} = \dfrac{360}{4} = 90°$

Phase shift → none

Phase shift = $\dfrac{-c}{b}$

② $y = 2 \sin(3\theta + 18°)$

Amp = 2

Period = $\dfrac{360}{b} = \dfrac{360}{3} = 120°$

Phase Shift = $\dfrac{-c}{b} = \dfrac{-18}{3} = -6°$

↑ left
6°

5

$$y = 8 \sin(2\theta - 10°)$$

$Amp = 8$

$$Period = \frac{360}{b} = \frac{360}{2} = 180°$$

$$P.S. = \frac{-c}{b} = \frac{10}{2} = 5° \text{ (right)}$$

$$y = 2 \cos(3\theta - 60°)$$

$amplitude = 2$

$$period = \frac{360}{b} = \frac{360}{3} = 120°$$

$$phase\ shift = \frac{-c}{b} = \frac{60}{3} = 20°$$
$$\text{(right)}$$

amplitude = 10
period = 180°
phase shift = 10°

$$y = 10 \sin(\underline{2}\theta - \underline{20})$$

period $= \dfrac{360}{b}$

$180° = \dfrac{360}{b}$

$b = 2$

p.s. $= \dfrac{-c}{b}$

$\dfrac{10°}{1} = \dfrac{-c}{2}$

$-c = 20$

$c = -20$

Amp = 800
period = 90°
phase shift = -8°

$$y = 800 \sin(\underline{4}\theta + 32)$$

$\dfrac{\text{period}}{1} = \dfrac{360}{b}$

$\dfrac{90}{1} = \dfrac{360}{b}$

$b = 4$

p.s. $= \dfrac{-c}{b}$

$\dfrac{-8}{1} = \dfrac{-c}{4}$

$-c = -32$

$c = 32$

amp = 2
period = 720°
phase shift = 8°

$$y = 2 \sin(\underline{\tfrac{1}{2}}\theta - \underline{4})$$

period $= \dfrac{360}{b}$

$\dfrac{720°}{1} = \dfrac{360}{b}$

$720b = 360$

$b = \tfrac{1}{2}$

p.s. $= \dfrac{-c}{b}$

$\dfrac{8}{1} = \dfrac{-c}{\tfrac{1}{2}}$

$-c = 4$

$c = -4$

$amp = 6$

$period = 1440$

$phase \ shift = -4$

$$y = 6 \sin\left(\frac{1}{4}\theta + 1\right)$$

$$period = \frac{360}{b}$$

$$\frac{1440}{1} = \frac{360}{b}$$

$$\frac{1440b}{1440} = \frac{360}{1440}$$

$$b = \frac{1}{4}$$

$$P.S. = \frac{-c}{b}$$

$$\frac{-4}{1} = \frac{-c}{1/4}$$

$$-c = -1$$

$$c = 1$$