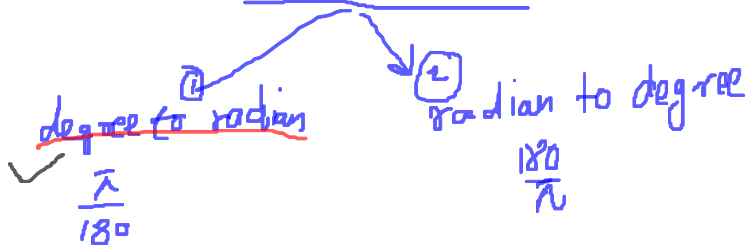


Topic: Trigonometric function

1. Conversion formula



⑤ Convert 1.4 radians into degree.

$$\begin{aligned} & 1.4\pi \\ &= \frac{7\pi}{5} \times \frac{180}{\pi} \\ &= 252^\circ \end{aligned}$$

① Convert 200° into radian:

$$\begin{aligned} &= \frac{200}{180} \times \frac{\pi}{1} \\ &= \frac{10\pi}{9} \text{ radian} \end{aligned}$$

② Convert 120° into radian

$$\begin{aligned} &= 120 \times \frac{\pi}{180} \\ &= \frac{2\pi}{3} \end{aligned}$$

③ Convert $\frac{4\pi}{9}$ to degree.

$$\begin{aligned} &= \frac{4\pi}{9} \times \frac{180}{\pi} \\ &= \frac{720}{9} \\ &= 80^\circ \end{aligned}$$

2. Periodic function:

A Function $f(x)$ is period, if there is a positive number p such that

$$f(x+p) = f(x) \quad \forall x$$

Then we say that p is the periodic function of $f(x)$

$$f(x) \\ f(x+p) = f(x) \\ p = f(x)$$

$$\textcircled{1} \quad y = \sin 2(x+\pi)$$

$$\begin{aligned} \text{sol:} &= \sin 2(x+\pi) = f(x+p) \\ &= \sin(2x+2\pi) \\ &= \sin 2x \\ &= f(x) \end{aligned}$$

$$\sin x \rightarrow 2\pi \\ 2(x+\pi) \\ 2x+2\pi$$

Period π :

$$\checkmark \tan(x+\pi) = \tan x$$

$$\checkmark \cot(x+\pi) = \cot x$$

period 2π

$$\textcircled{1} \checkmark \sin(x+2\pi) = \sin x$$

$$\textcircled{2} \checkmark \cos(x+2\pi) = \cos x$$

$$\checkmark \sec(x+2\pi) = \sec x$$

$$\checkmark \csc(x+2\pi) = \csc x$$

$$f(x+p) = f(x)$$

$p = \pi$ is period of $\sin 2x$

$$\textcircled{2} \quad y = \sin\left(\frac{x}{2}\right)$$

$$= \sin\left(\frac{x+4\pi}{2}\right)$$

$$= \sin\left(\frac{x}{2} + \frac{2\pi}{2}\right)$$

$$= \sin\left(\frac{x}{2} + 2\pi\right)$$

$$= \sin\left(\frac{x}{2}\right) \quad p = 4\pi$$

$\textcircled{3}$

$$y = \cos \pi x$$

sol:

$$= \cos \pi(x+2)$$

$$= \cos(\pi + 2\pi)$$

$$= \cos \pi x$$

$$p = 2$$

$$\checkmark \textcircled{1} \sin(x+2\pi) = \sin x \\ p = 2\pi$$

$$\textcircled{2} \cos(x+2\pi) = \cos x \\ p = 2\pi$$

$$\textcircled{4} \cos\left(\frac{\pi x}{2}\right)$$

$$y = \cos\left(\frac{\pi(x+4)}{2}\right)$$

sol:

$$= \cos\frac{\pi}{2}(x+4)$$

$$= \cos\left(\frac{\pi x}{2} + \frac{4\pi}{2}\right)$$

$$= \cos\left(\frac{\pi x}{2} + 2\pi\right)$$

$$= \cos\frac{\pi x}{2}$$

$$\boxed{p=4}$$

$$y = \cos\left(x - \frac{\pi}{2}\right)$$

$$= \cos\left(x + 2\pi - \frac{\pi}{2}\right)$$

$$= \cos\left(x - \frac{\pi}{2} + 2\pi\right)$$

$$= \cos\left(x - \frac{\pi}{2}\right)$$

$$\boxed{p=2\pi}$$

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$$- \sin\frac{\pi x}{3}$$

$$= - \sin\frac{\pi}{3}(x+6)$$

$$= - \sin\left(\frac{\pi}{3}x + \frac{\pi 6}{3}\right)$$

$$= - \sin\left(\frac{\pi}{3}x + 2\pi\right)$$

$$= - \sin\frac{\pi}{3}x$$

$$\boxed{p=6}$$

6 $-\cos 2\pi x$

$$= -\cos 2\pi(x+1)$$

$$= -\cos(2\pi x + 2\pi)$$

$$= -\cos(2\pi x)$$

$$\boxed{p=1}$$

$$x = x + p$$

$$\sin(x + \frac{\pi}{2})$$

$$= \sin(x + 2\pi + \frac{\pi}{2})$$

$$= \sin(x + \frac{\pi}{2} + 2\pi)$$

$$= \sin(x + \frac{\pi}{2})$$

$$\boxed{p=2\pi}$$

$$f(x+p) = f(x)$$

?

$$\sin\left(x - \frac{\pi}{4}\right) + 1 \quad ; \quad p = ?$$

$$= \sin\left(x + 2\pi - \frac{\pi}{4}\right) + 1$$

$$= \sin\left(x - \frac{\pi}{4} + 2\pi\right) + 1$$

$$= \sin\left(x - \frac{\pi}{4}\right) + 1$$

$$\boxed{p=2\pi}$$

