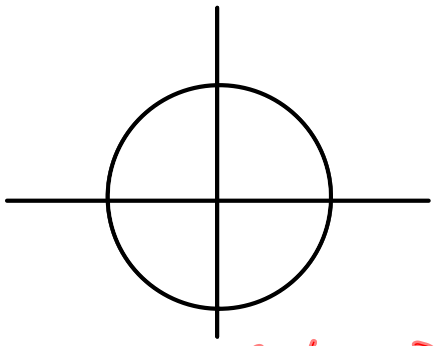


$\sin\left(\frac{89\pi}{3}\right)$

Observe that sine's period is 2π.

Divide out all the 2π's in there & get after the remainder.

$\frac{89}{2} = \frac{88}{2} + \frac{1}{2}$

College Algebra – Division Algorithm

$\frac{28}{3} = 9 + \frac{1}{3}$

$28 = 9\cdot 3 + \frac{1}{3}\cdot 3$

$= 9\cdot 3 + 1$ remainder

$$\frac{\frac{89\pi}{3}}{2\pi} = \frac{89\cancel{\pi}}{3}\cdot\frac{1}{2\cancel{\pi}}$$

$$\frac{88\pi + 1\pi}{2\cdot 3\cdot \pi} = \frac{88+1}{2\cdot 3}$$

$$= \frac{88}{6} + \frac{1}{6}$$

$$= \frac{44}{3} + \frac{1}{6}$$

Idiot

$$\frac{\frac{89\pi}{3}}{2\pi} = \frac{89\pi}{6\pi} = \frac{89}{6} = 14.8\overline{3}$$

$$\frac{89}{6} = 14 + \frac{5}{6}$$

$$\frac{\frac{89\pi}{3}}{2\pi} = 14.8\overline{3} = 14 + .8\overline{3}$$

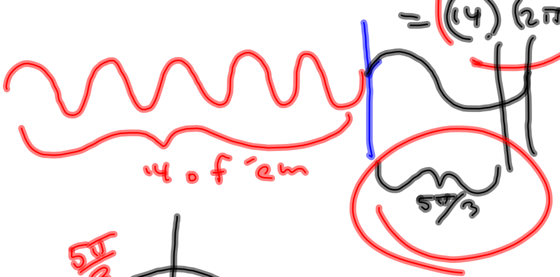
$$= 14 + \frac{5}{6}$$

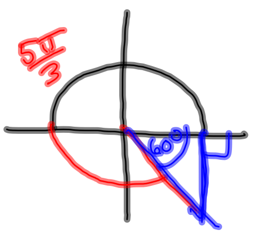
$$\frac{89\pi}{3} = 14\cdot 2\pi + .8\overline{3}\ 2\pi$$

$$14\cdot 2\pi + \frac{5}{\cancel{6}_{3}}\cdot \cancel{2}\pi$$

$$= (14)\cdot(2\pi) + \frac{5\pi}{3}$$

Has same sine as $\frac{89\pi}{3}$



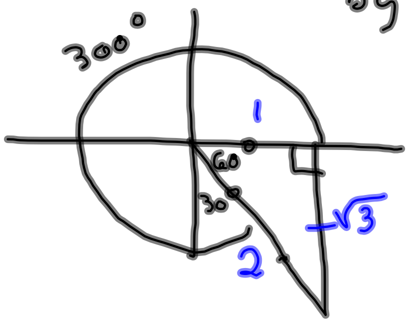


$$\frac{89\pi}{3} = \frac{89\pi}{3}\cdot\frac{180}{\pi} = {}^{5}89\cdot 60 = 5340^\circ$$

sohcahtoa

$$\frac{5340^\circ}{360^\circ} = \frac{534}{36} = 14.8\overline{3} = 14 + .8\overline{3}$$

$$\Rightarrow 5340^\circ = \underbrace{\boxed{14\cdot 360}}_{\text{"Mod" out by 360}} + \underbrace{.8\overline{3}\cdot 360}_{\text{The piece we want}} = 300^\circ$$



$$\sin\left(\frac{89\pi}{3}\right) = -\frac{\sqrt{3}}{2}$$

div

mod

5 mod 2 = 1, because

$5 \div 2 = 2$, $\boxed{r\ 1}$

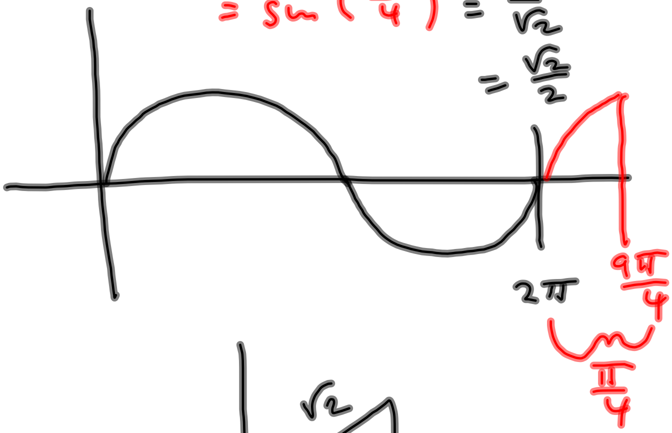
We're doing

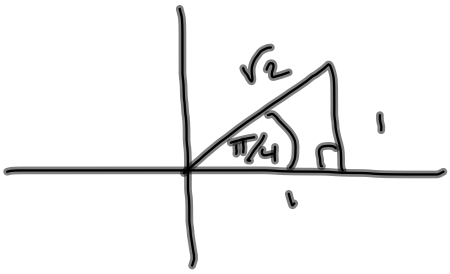
$\frac{89\pi}{3}$ mod 2π

5340° mod 360° = remainder when 5340 is divided by 360. That remainder is an angle between 0 & 360° that we use to find sine, etc.

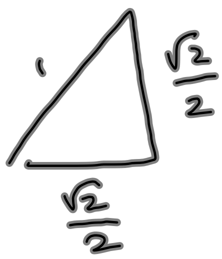
$$\sin\left(\frac{9\pi}{4}\right) = \sin\left(\frac{\pi}{4}\right) = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\frac{9\pi}{4} = \frac{8\pi}{4} + \frac{1\pi}{4} = 2\pi + \frac{\pi}{4}$$





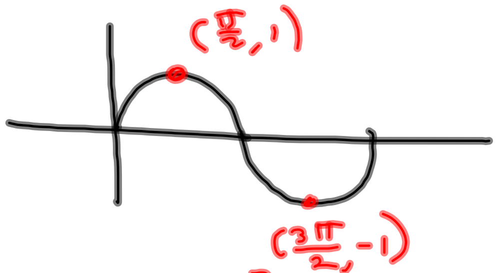
Same deal.



Amplitude

$\frac{1}{2}[\text{HIGH} - \text{LOW}]$

$\sin x$ has AMPLITUDE 1



$\frac{1}{2}[1-(-1)] = 1$

Period

$\sin(x)$ has period 360° or 2π radians.

What's the period and amplitude of $7\sin(2x)$

Amp: 7

T: $\pi = \frac{2\pi}{2}$

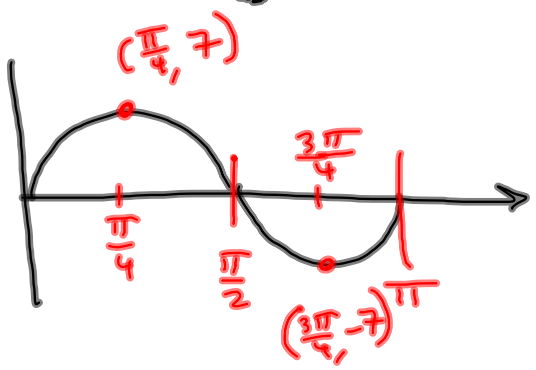
when does $2x$ reach 2π?

$2x = 2\pi$

$x = \pi$

Quick sketch of

$7\sin(2x)$



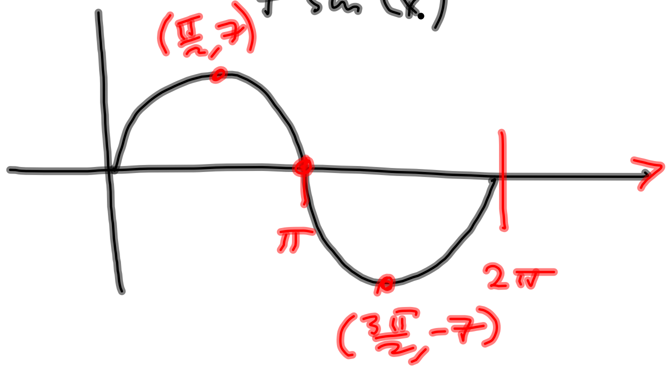
High pt & Low point.

$-f(x)$ vertical flip.

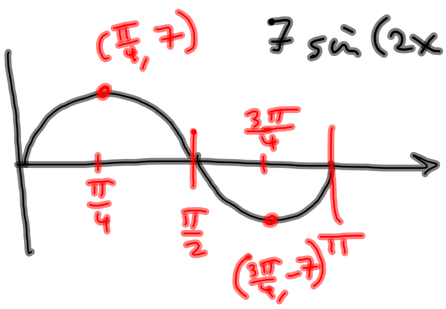
$f(2x)$

$(x, y) \longrightarrow (\frac{1}{2}x, y)$

$7\sin(x)$



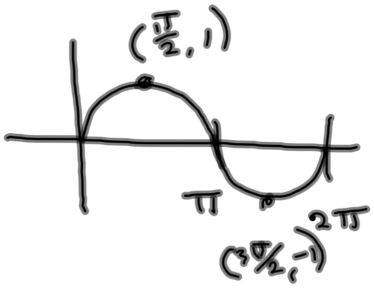
$7\sin(2x)$



$$-5\sin\left(\pi x - \tfrac{1}{2}\pi\right) = -5\sin\left(\pi\left(x - \tfrac{1}{2}\right)\right)$$

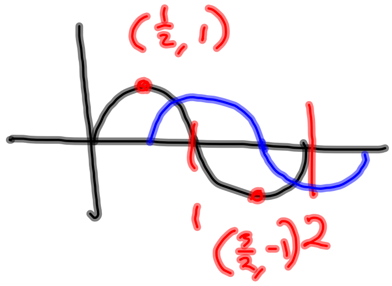
is still the key to the period.

$\frac{2\pi}{\pi} = 2$ = Period

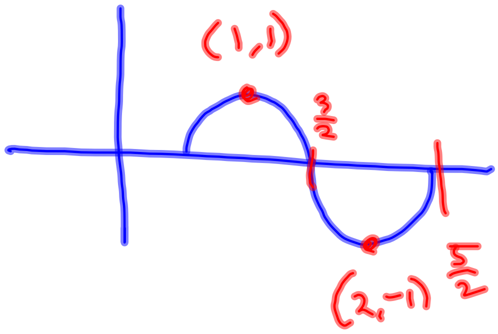


sin(x)

sin(πx)



$\sin(\pi(x - \frac{1}{2}))$ Delay previous graph by $\frac{1}{2}$.



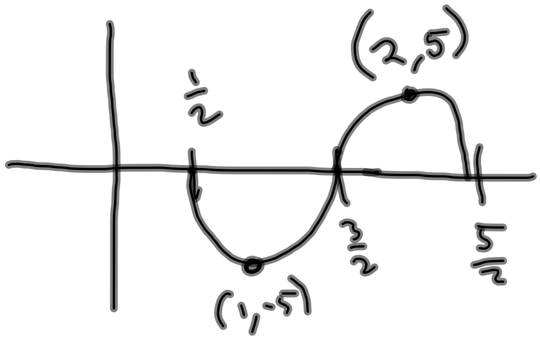
$\frac{3}{2} + \frac{1}{2} = 2$

$2 + \frac{1}{2} = \frac{5}{2}$

IOU
$f(x) \pm K$

$-5\sin(\pi(x - \frac{1}{2})) = -5 f(\pi(x - \frac{1}{2}))$

= -5 times previous y-values



$\boxed{\text{Example 7, pg 179}}$

Test question on daily temperature