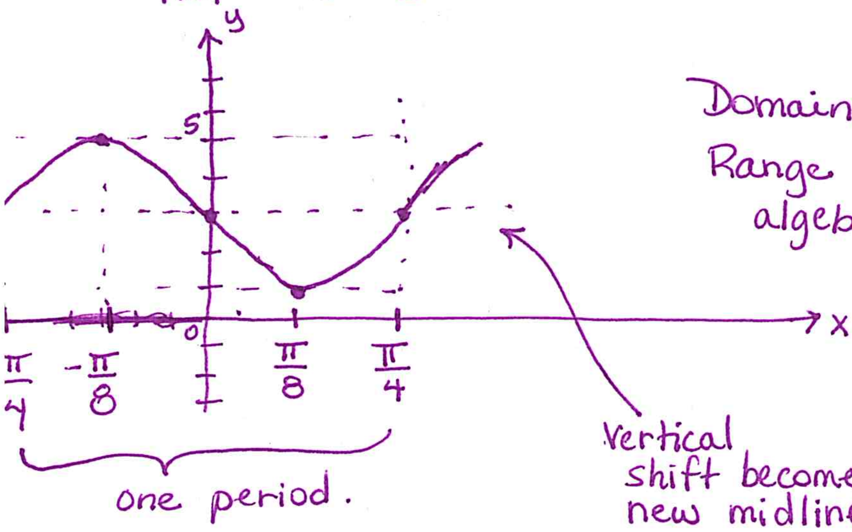
p 49 # 18, 20, 21, 22, 25, 29

(18) $y = 2\sin(4x + \pi) + 3$ → 3 units up

period $= \frac{2\pi}{4} = \frac{\pi}{2}$

phase shift $= -\frac{\pi}{4}$ (left)

Amplitude $= 2$



Domain $(-\infty, \infty)$

Range $[1, 5]$

algebraically

$-1 \le \sin(4x + \pi) \le 1$

at -1 $y = -2 + 3 = 1$ min value

at $+1$ $y = 2 + 3 = 5$ max value

Can also make a table of values & graph them:

	x	$y = 2\sin(4x + \pi) + 3$
start at phase shift, count up by $\frac{1}{4}$(period)	$-\frac{\pi}{4}$	3
	$-\frac{\pi}{8}$	5
	0	3
	$\frac{\pi}{8}$	1
	$\frac{2\pi}{8}$	3

evaluate function at each x.

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

Amplitude = 2

vertical shift = 0

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

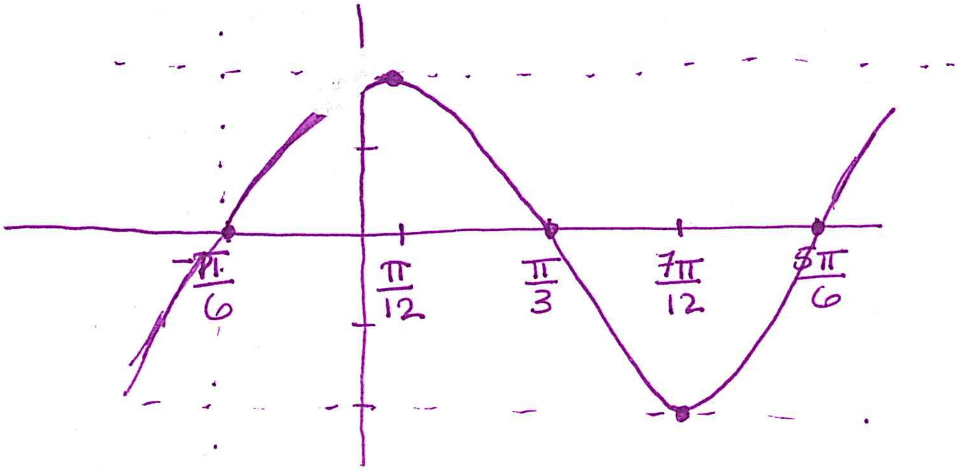
phase shift = $-\frac{\pi}{6}$ (left)

Domain: $(-\infty, \infty)$

Range: $(-2, 2)$

max value [when sin( ) = 1] = 2

min value [when sin( ) = -1] = -2

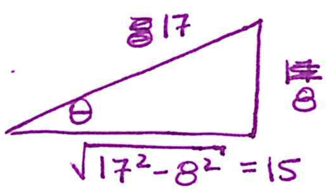


(21) $\theta = \sin^{-1}\left(\frac{8}{17}\right)$ $\frac{\text{opp}}{\text{hyp}}$

inverse sin is only defined for $-1 \le x \le 1$

Range $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$ * We forgot to talk about this!

sin is positive when $0 \le \theta \le \frac{\pi}{2}$



$\sin\theta = \frac{8}{17}$ $\csc\theta = \frac{17}{8}$

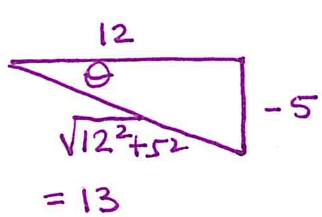
$\cos\theta = \frac{15}{17}$ $\sec\theta = \frac{17}{15}$

$\tan\theta = \frac{8}{15}$ $\cot\theta = \frac{15}{8}$

(22) $\theta = \tan^{-1}\left(-\frac{5}{12}\right)$

range for $\tan^{-1}$ is $-\frac{\pi}{2} < \theta < \frac{\pi}{2}$ * we forgot to talk about this.

tan is negative when $-\frac{\pi}{2} < \theta < 0$ 4th quadrant



$\sin\theta = -\frac{5}{13}$ $\csc\theta = -\frac{13}{5}$

$\cos\theta = \frac{12}{13}$ $\sec\theta = \frac{13}{12}$

$\tan\theta = -\frac{5}{12}$ $\cot\theta = -\frac{12}{5}$

(25) $\tan x = 2.5 \qquad 0 \le x \le 2\pi$

$x = \tan^{-1}(2.5)$

$\boxed{x = 1.19}$

$x = 1.19 + \pi = \boxed{4.33}$

2 solutions.

(29.) $\sin x = -.5 \qquad -\infty < x < \infty$

$x = \sin^{-1}\left(-\frac{1}{2}\right)$

$x = \frac{7\pi}{6} + 2k\pi$

$x = \frac{11\pi}{6} + 2k\pi$

where k is an integer

since sine is periodic with a period of 2π, ~~we need to~~ the solution will repeat every 2π throughout the domain.