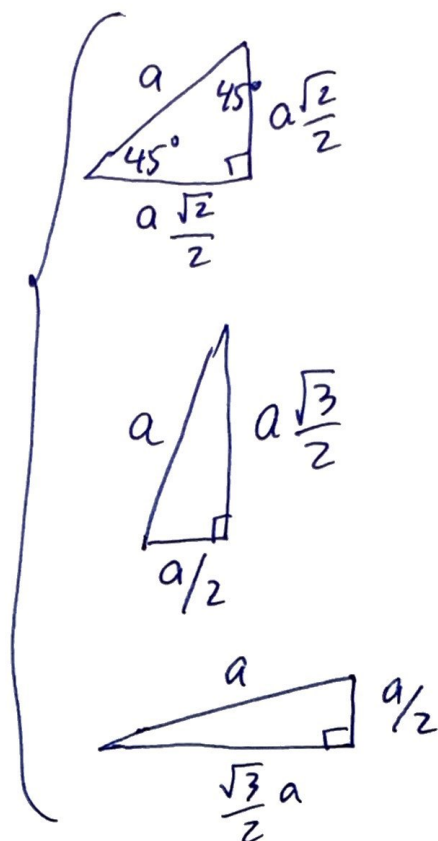


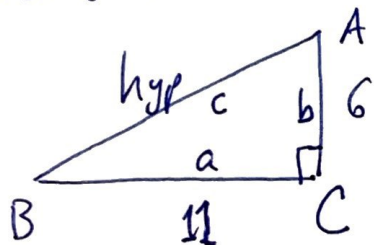
Chpt 5 Review (Cont.)

* Right triangles (Δ)

Recall the popular Δ 's



EX Complete the Δ values

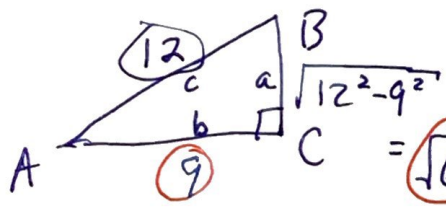


$$(a) \sin A = \frac{\text{opp}}{\text{hyp}} = \frac{11}{\sqrt{157}}$$

$$(b) \tan B = \frac{\text{opp}}{\text{adj}} = \frac{6}{11}$$

$$c = \text{hyp} = \sqrt{11^2 + 6^2} = \sqrt{157}$$

EX Find missing sides of ΔABC if $\sin B = \frac{3}{4}$ and $c = 12$

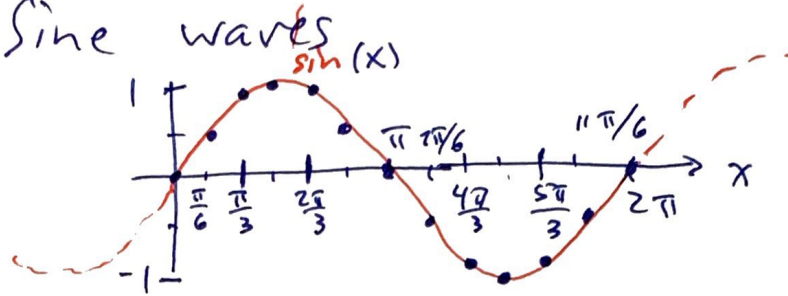
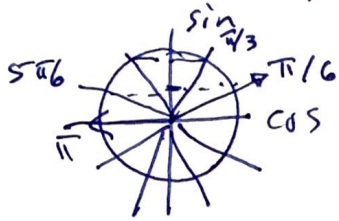


$$\sin B = \frac{3}{4} \Rightarrow \frac{a}{12} = \frac{3}{4} \Rightarrow a = 9$$

$$b = \sqrt{12^2 - 9^2} = \sqrt{63}$$

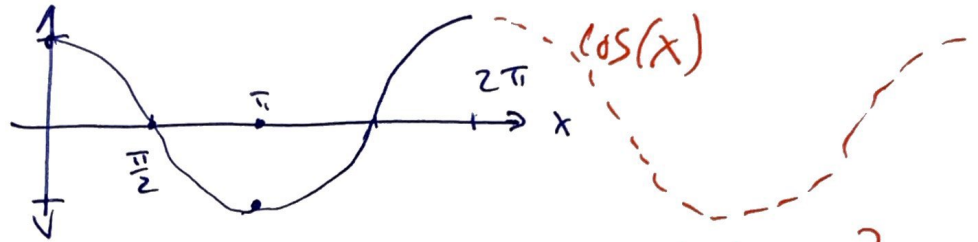
Chapter 6: Trig Functions & Their Graphs (1)

6.1 Cosine & Sine waves

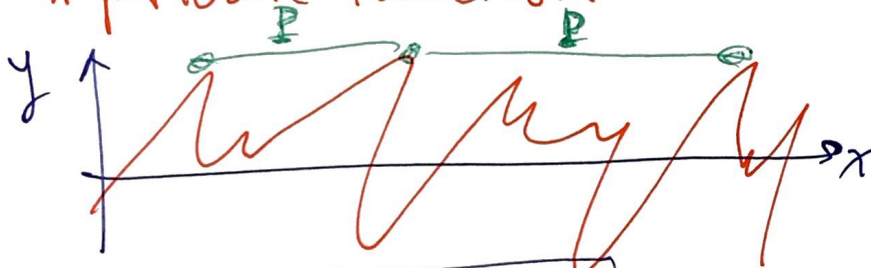


$$\frac{\sqrt{3}}{2} \approx 0.9$$

$$\frac{\sqrt{2}}{2} \approx 0.7$$



* periodic function



$$f(x \pm nP) = f(x)$$

$$D_{\cos/\sin} = \{x | x \in \mathbb{R}\}$$

$$R_{\cos/\sin} = \{y | y \in [-1, 1]\}$$

P = period

* generic forms: $y = A \sin(Bx - C) + D$

$$y = A \cos(Bx - C) + D$$

↑ amplitude ↑ "horizontal shift"

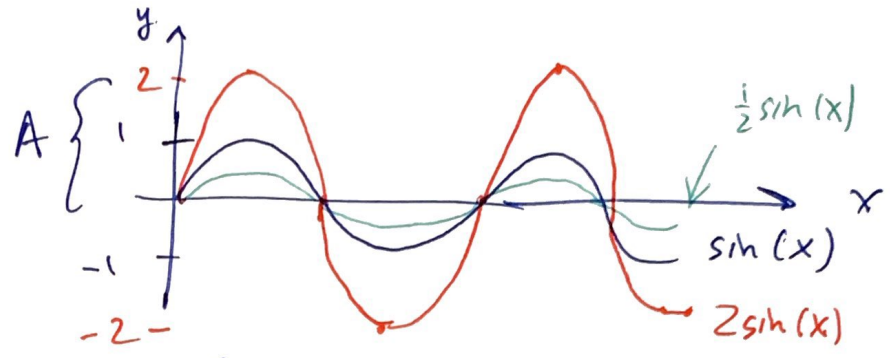
↑ vertical shift

Better to write these so x is by itself

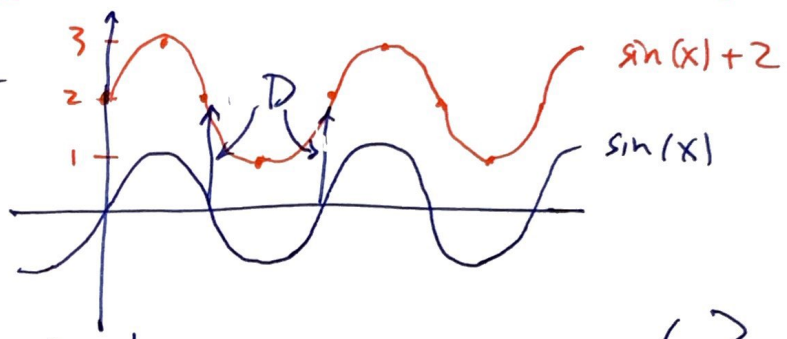
$$\begin{cases} y = A \sin\left(B\left(x - \frac{C}{B}\right)\right) + D \\ y = A \cos\left(B\left(x - \frac{C}{B}\right)\right) + D \end{cases}$$

↑ true horizontal shift

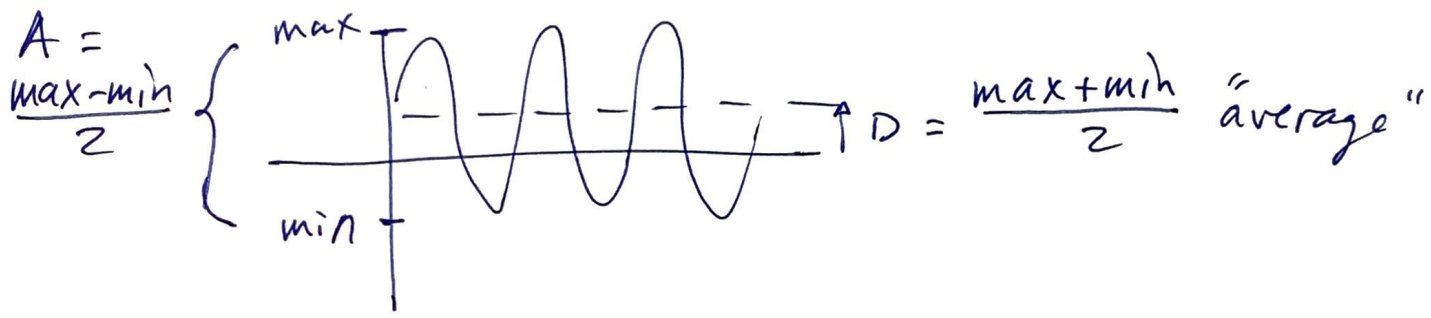
* Amplitude



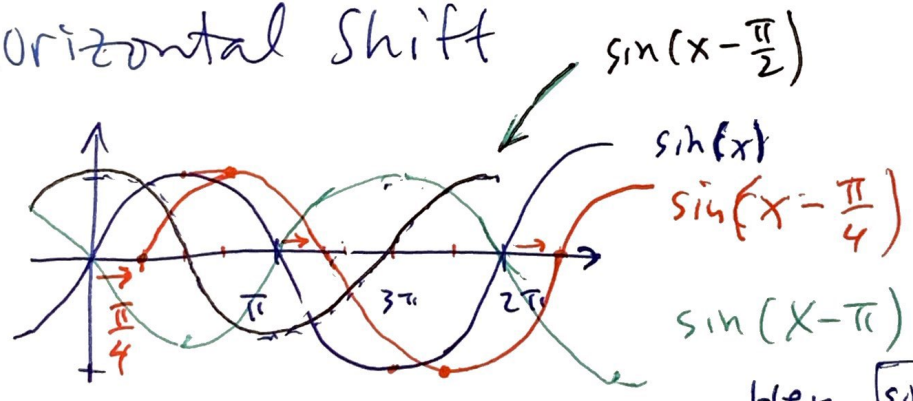
* Vertical Shift



Q: How do we find A & D given a graph?



* Horizontal Shift



Identities

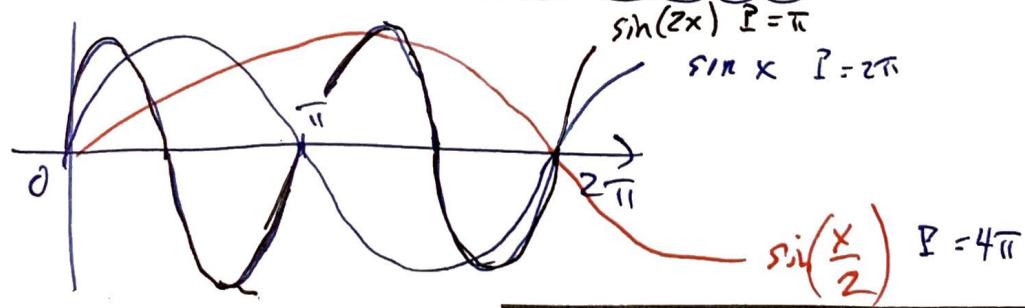
Hey $\sin(x - \pi) = -\sin(x)$

Hey $\sin(x - \frac{\pi}{2}) = \cos(x)$

* Period

$P = \frac{2\pi}{B}$

$y = A \sin(B(x - \frac{C}{B})) + D$

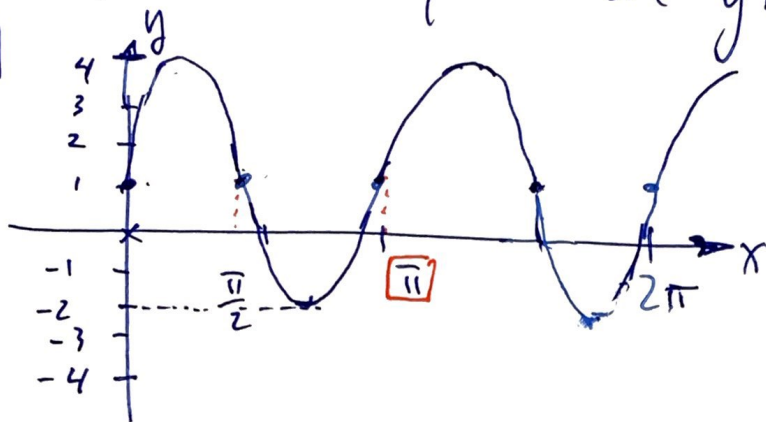


(*)

EX

Find the equation given a graph

(3)



$$A: \begin{array}{l} \text{min@ } -2 \\ \text{max@ } 4 \end{array}$$

$$A = \frac{4 - (-2)}{2} = \boxed{3}$$

$$D: \frac{4 + (-2)}{2} = \boxed{1}$$

$$B: P = \frac{2\pi}{B}$$

$$B = \frac{2\pi}{P} = \frac{2\pi}{\pi} = \boxed{2}$$

$$C = 0$$



$$y = 3 \sin(2x) + 1$$

* Graph a given equation $y = A \cos(B(x - \frac{C}{B})) + D$ (4)

EX Graph $y = 2 \cos(3x - \frac{\pi}{4})$

(o) $y = 2 \cos(3(x - \frac{\pi}{12}))$

(i) $P = \frac{2\pi}{B} = \frac{2\pi}{3}$

(ii) determine $P/4 = \frac{2\pi/3}{4} = \frac{\pi}{6}$ } LCD = $\frac{\pi}{12}$
Tick marks.

(iii) start @ $\pi/12$

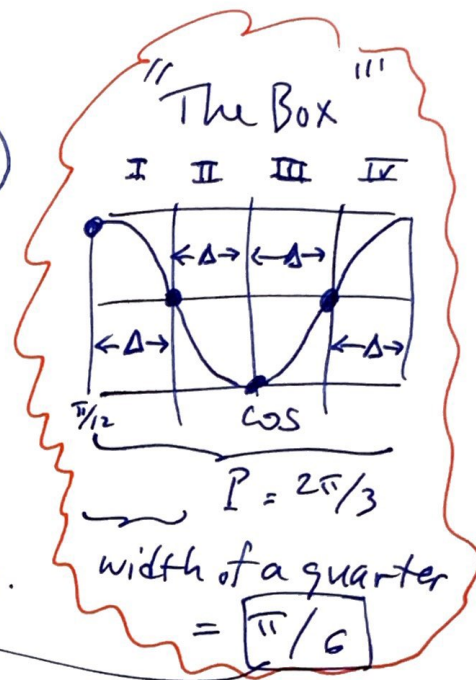
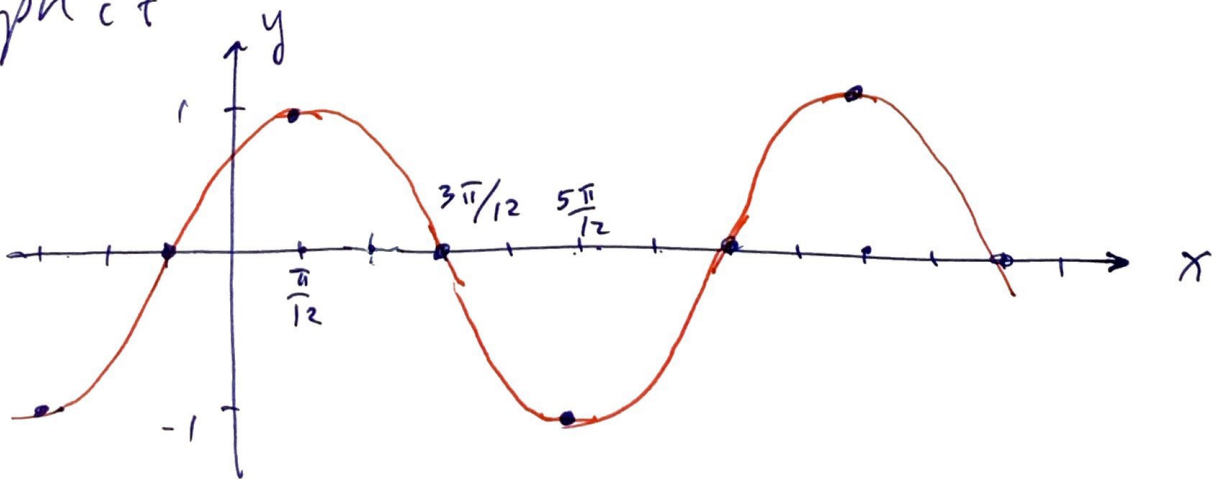
(iv) $\Delta = \frac{\pi}{6} = \frac{2\pi}{12}$ ←

(v) 5-Key Points on the x-axis:

$$\frac{\pi}{12}, \frac{\pi}{12} + \frac{2\pi}{12} = \frac{3\pi}{12}, \frac{3\pi}{12} + \frac{2\pi}{12} = \frac{5\pi}{12}, \frac{5\pi}{12} + \frac{2\pi}{12} = \frac{7\pi}{12}, \frac{7\pi}{12} + \frac{2\pi}{12} = \frac{9\pi}{12}$$

or $\left(\frac{\pi}{12}, \frac{3\pi}{12}, \frac{5\pi}{12}, \frac{7\pi}{12}, \frac{9\pi}{12} \right)$

• graph it



Ex graph $f(t) = 4 \cos\left(2t + \frac{\pi}{2}\right) - 3$

5

$$f(t) = 4 \cos\left(2t + \frac{\pi}{2}\right) - 3$$

$$y = 4 \cos \left(2 \left[t + \frac{\pi}{4} \right] \right) - 3$$

$$(i) P = \frac{2\pi}{B} = \frac{2\pi}{2} = \boxed{\pi}$$

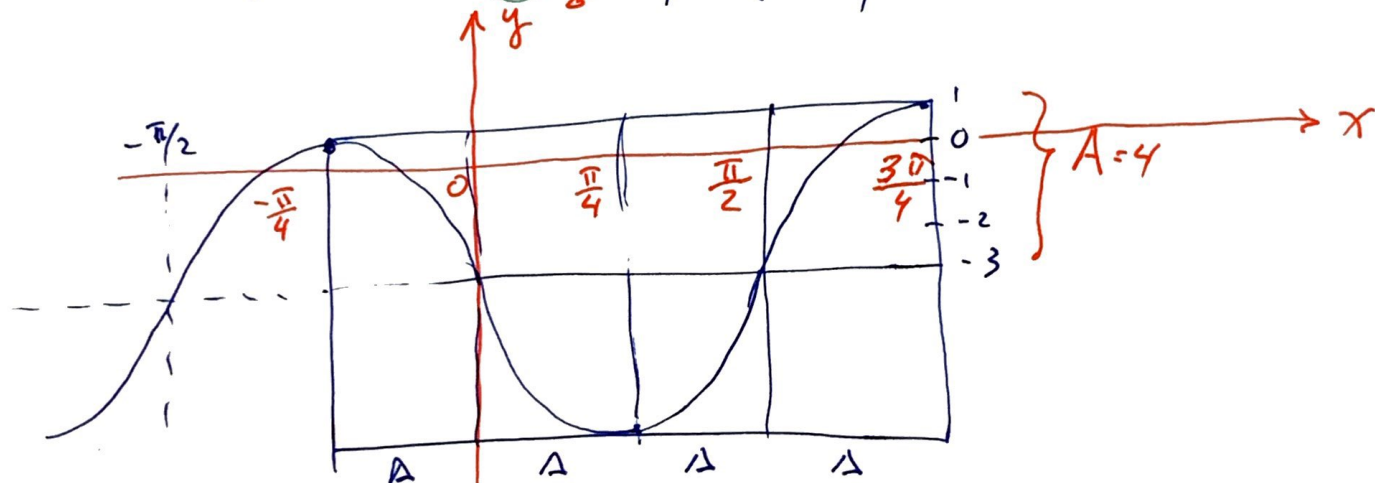
(ii) $P/4 = \pi/4$

(iii) $\text{start} = -\pi/4$
(iv) $\Delta = \pi/4$

$\left. \begin{array}{l} \text{(iii)} \\ \text{(iv)} \end{array} \right\} \text{LCD} = \frac{\pi}{4}$

(iv) $\Delta = \pi/4$

(v) 5-Key points: $-\frac{\pi}{4}, 0, \frac{\pi}{4}, \frac{2\pi}{4}, \frac{3\pi}{4}$



[EX] $p(t) = 35 \sin\left(\frac{\pi}{6}t + \frac{\pi}{3}\right)$
 $= 35 \sin\left(\frac{\pi}{6}(t+2)\right)$

"t" has a multiple of π (6)

(i) $P = \frac{2\pi}{\pi/6} = 12$

(ii) $P/4 = 12/4 = 3 = \Delta$

(iii) start @ -2 } LCD = 1

(iv) $\Delta = 3$

(v) $\boxed{-2, 1, 4, 7, 10}$

