

Combining Transformations

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

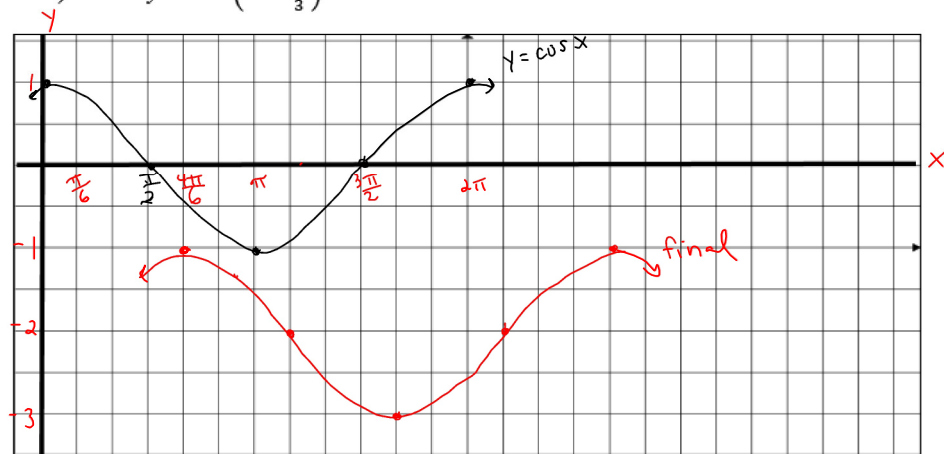
A - Vertical stretch/compression ($|A| = \text{amp}$)

B - Horizontal stretch/compression ($p = \frac{2\pi}{B}$)

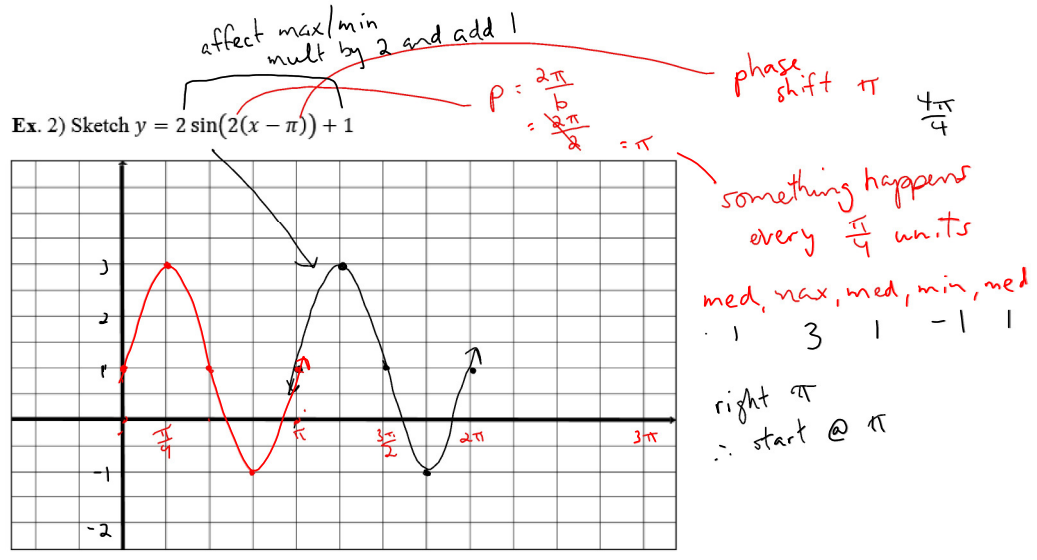
C - Phase Shift (left/right)

D - Displacement (up/down)

Ex.1) Sketch $y = \cos\left(x - \frac{2\pi}{3}\right) - 2$



Combining Transformations.notebook



can check

not on formula sheet

$$A = \frac{\text{max} - \text{min}}{2}$$

$$= \frac{3 - (-1)}{2}$$

$$= 2 \quad \leftarrow \text{amp}$$

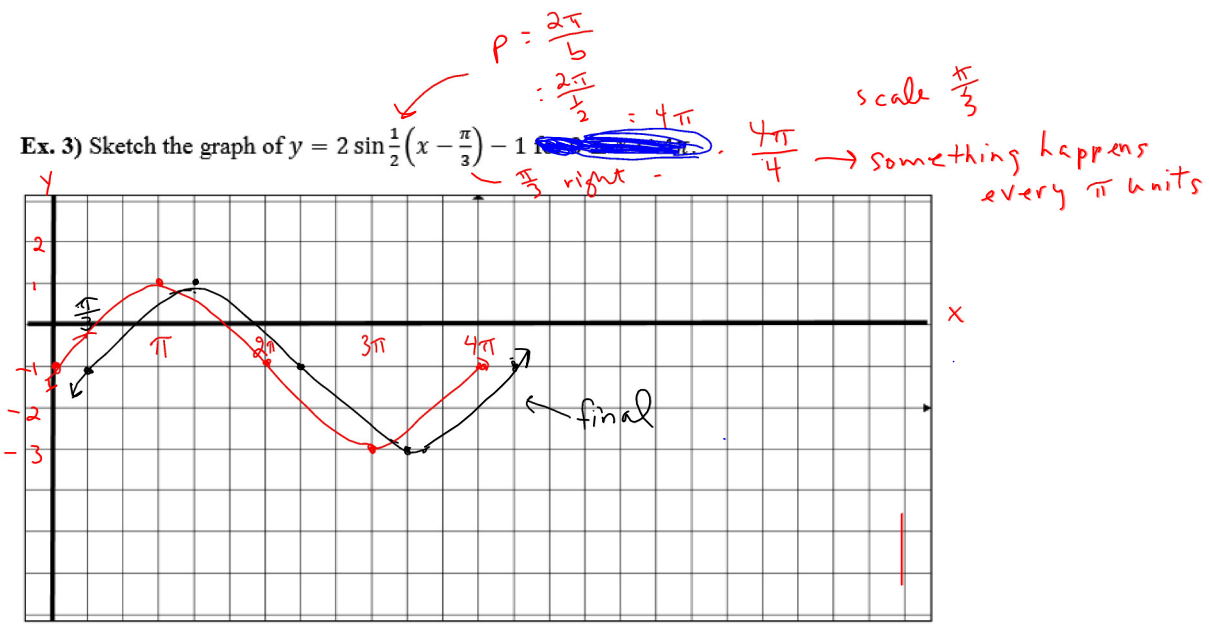
$$D = \frac{\text{max} + \text{min}}{2}$$

$$= \frac{3 + (-1)}{2}$$

$$= 1 \quad \leftarrow \text{median}$$

- ① Period $\frac{2\pi}{B}$
Divide period by 4
- ② Compare w/c
scale is common denominator of these 2 values
- ③ Determine new max/min values using A and D
new median using D
- ④ Plot new median, max, med, min, med using new scale
- ⑤ Move left/right

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down 1
 so med is -1
 med, max, med, min, med
 -1 1 -1 -3 -1
 right $\frac{\pi}{3}$
 start @ $\frac{\pi}{3}$