

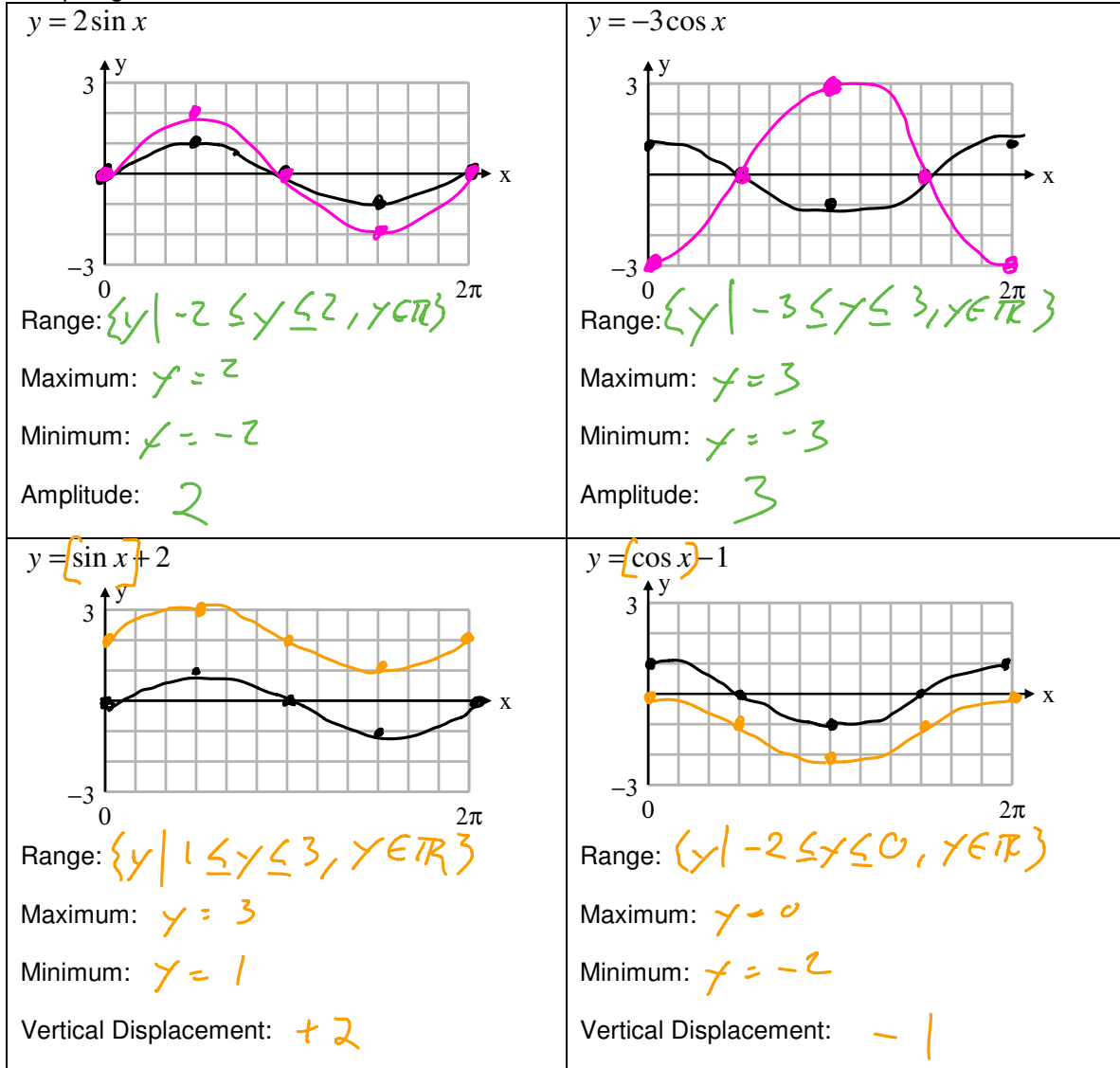
## 5.2 Transforming Sine & Cosine Graphs $y = a \sin(\omega x + c) + d$

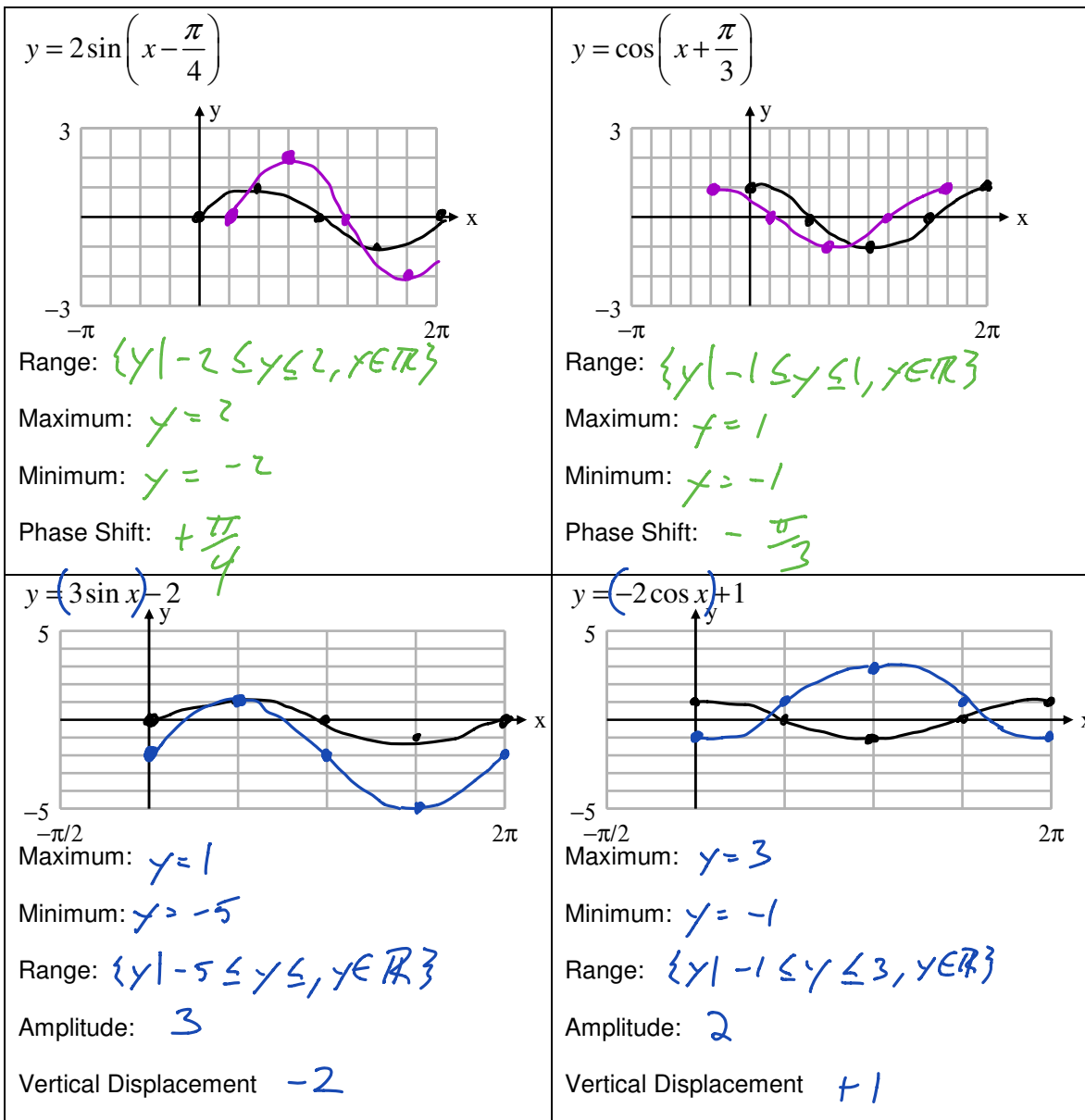
$a$  – amplitude (Chapter 1 term – vertical expansion/compression) ←

$c$  – phase shift (Chapter 1 term – horizontal translation)

$d$  – vertical displacement (Chapter 1 – vertical translation)

Graphing:





#### Graphing Tips (for chapter 5 only)

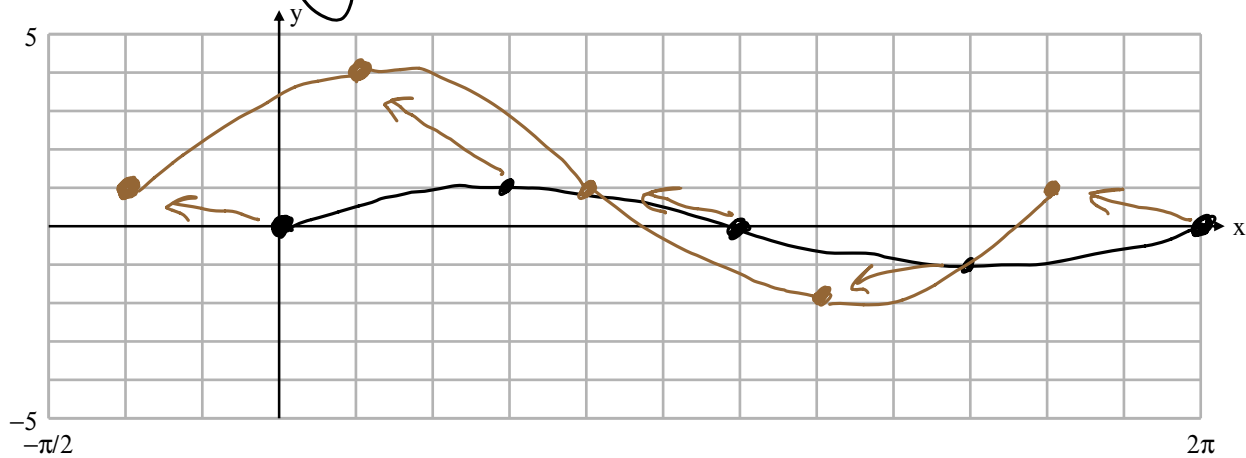
1. Do vertical displacement and amplitude at the same time! (only because of the periodic nature of the functions)
2. Then apply the phase shift (translate left/right)

Formulae:

$amp = \frac{MAX - MIN}{2}$	$VD = \frac{MAX + MIN}{2}$	$MAX = d +  a $	$MIN = d -  a $
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Graph:  $y = 3 \sin \left( x + \frac{\pi}{3} \right) + 1$

How far?  $\leftarrow 2$  bars



Amplitude: $3$	Vertical Displacement: $+1$
Maximum(s) $y = 4$	Minimum(s): $y = -2$
Phase Shift: $-\frac{\pi}{3}$	Period: I know... boring $2\pi$

Write the function graphed below in as many ways as you can.

