	$A\sin(Bx+C)+D$	$y=A\cos(Bx+C)+D$
0	$0+D$	$A+D$
$\frac{1}{4}P$	$A+D$	$0+D$
$\frac{1}{2}P$	$0+D$	$-A+D$
$\frac{3}{4}P$	$-A+D$	$0+D$
P	$0+D$	$A+D$

Amplitude: $|A|$

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

Phase shift: $\phi=-\frac{C}{B}$ or $=-C\cdot\frac{1}{B}$ ← fraction

V.T: $y=D$

$y=3\sin(2x+0)$

Amplitude: $|A|=3$ Period: $P=\frac{2\pi}{B}=\frac{2\pi}{2}=\pi$

Phase shift: $\phi=-\frac{C}{B}=0$ V.T: $y=0$

$y=2\sin\frac{1}{2}x$

$|A|=2$ $P=\frac{2\pi}{B}=\frac{2\pi}{\frac{1}{2}}=4\pi$

$\phi=-\frac{C}{B}=0$ V.T: $y=0$

Ex $y = -4\sin(-\pi x)$ $C = 0$

$|A| = 4$ $\quad P = \frac{2\pi}{B} = \frac{2\pi}{-\pi} = -2$

$\phi = -\frac{C}{B} = 0$ $\quad$ V.T: $y = 0$

Even fctns	Odd fctns
Cosine secant	sine, tangent cosecant, cotangent

$\cos(-\theta) = \cos\theta$ $\quad$ $\sin(-\theta) = -\sin\theta$

Find the amplitude, Period, phase shift, vertical translation, table, the graph & Label (1 cycle)

$\sin$
$\cos$ $(Bx + C)$ → argument

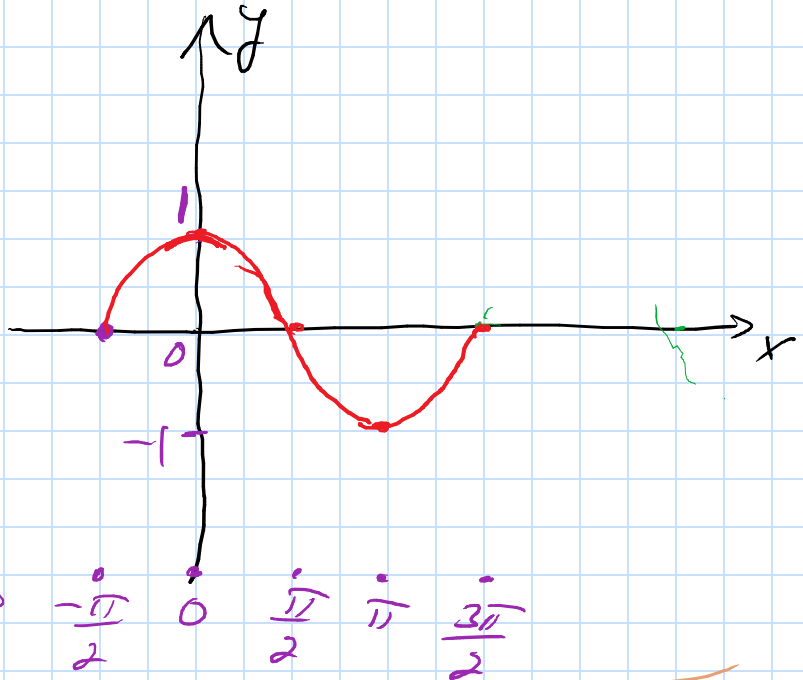
ϕ? $\quad Bx + C = 0$

$\phi = -\frac{C}{B}$

1) $y = \sin\left(x + \frac{\pi}{2}\right)$ 1 cycle

$|A| = 1$ $\quad P = \frac{2\pi}{1} = 2\pi$ $\quad \varphi = -\frac{\pi}{2} = -\frac{C}{B}$ $\quad$ V.T: $y = 0$

	x	y
0 $-\frac{\pi}{2}$	$-\frac{\pi}{2}$	0
$\frac{\pi}{2}$ $-\frac{\pi}{2}$	0	1
π	$\frac{\pi}{2}$	0
$\frac{3\pi}{2}$	π	−1
2π	$\frac{3\pi}{2}$	0

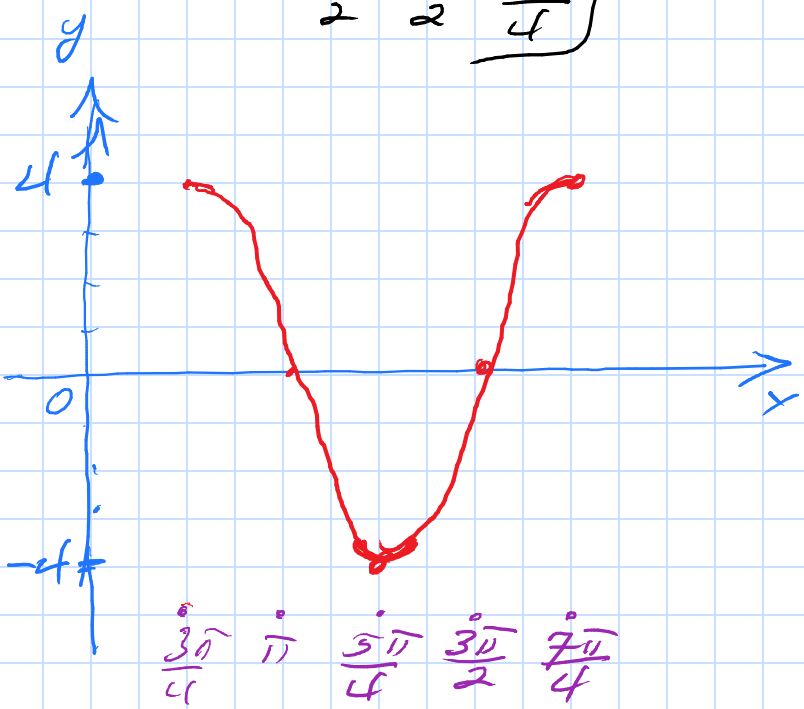


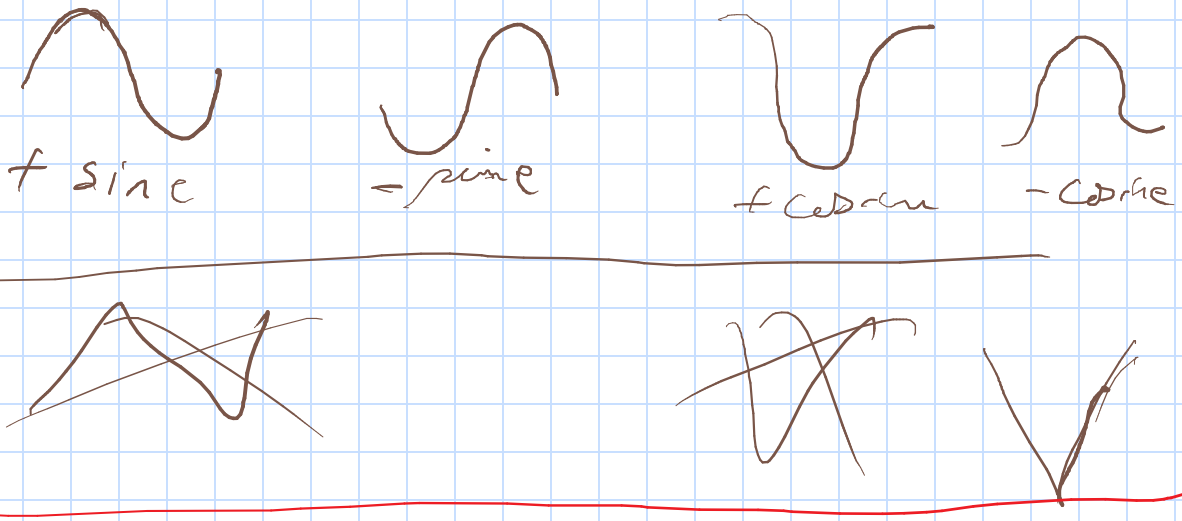
$y = 4\cos\left(2x - \frac{3\pi}{2}\right)$

$|A| = 4$ $\quad P = \frac{2\pi}{2} = \frac{2\pi}{2} = \pi$ $\quad \varphi = -\frac{C}{B} = \frac{3\pi}{2}\cdot\frac{1}{2} = \frac{3\pi}{4}$

V.T: $y = 0$

	x	y
0 $+\frac{3\pi}{4}$	$\frac{3\pi}{4}$	4
$\frac{\pi}{4}$ $+\frac{3\pi}{4}$	π	0
$\frac{\pi}{2}$	$\frac{5\pi}{4}$	−4
$\frac{3\pi}{4}$	$\frac{3\pi}{2}$	0
π	$\frac{7\pi}{4}$	4



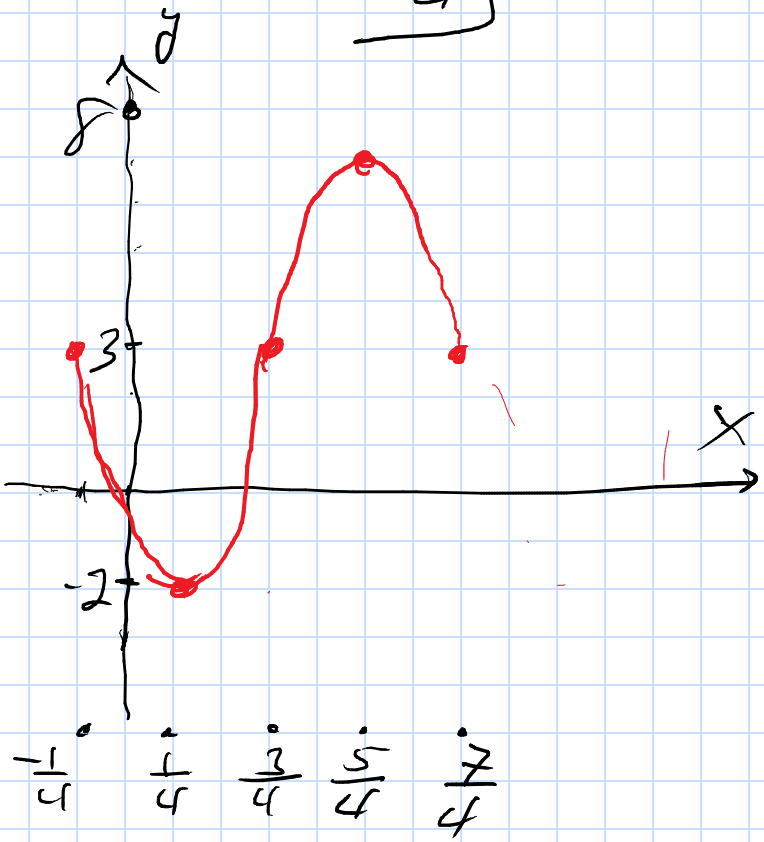


4) $y = 3 - 5\sin\left(\pi x + \frac{\pi}{4}\right)$

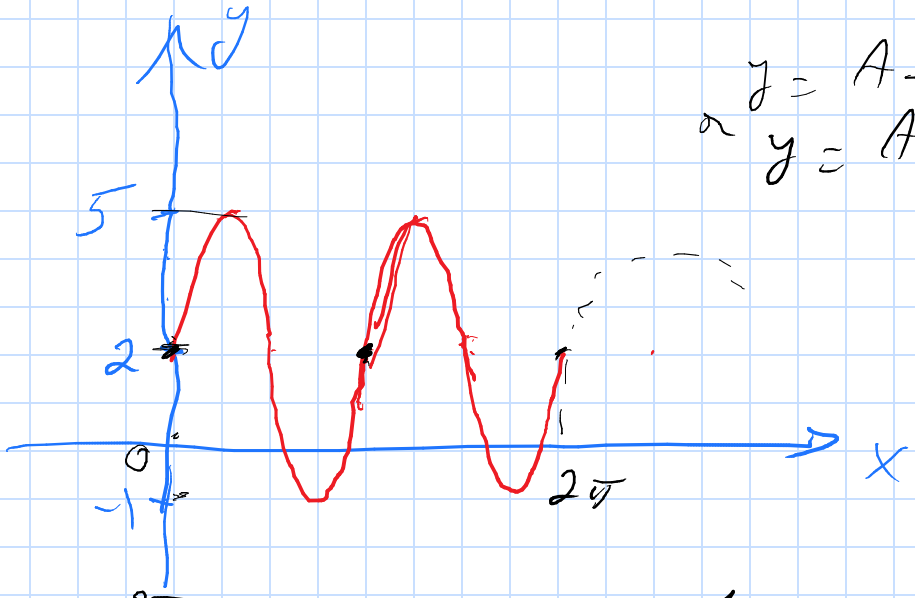
$|A| = 5$ $\quad P = \frac{2\pi}{B} = \frac{2\pi}{\pi} = 2$ $\quad \Phi = -\frac{C}{B} = -\frac{\pi}{4} \cdot \frac{1}{\pi} = -\frac{1}{4}$

VT: $y = 3$

		x	y	
0	$-\frac{1}{4}$	$-\frac{1}{4}$	$0 + 3$	3
$\frac{1}{2}$	$-\frac{1}{4}$	$\frac{1}{4}$	$-5 + 3$	-2
1		$\frac{3}{4}$	$0 + 3$	3
$\frac{3}{2}$		$\frac{5}{4}$	$5 + 3$	8
2		$\frac{7}{4}$	$0 + 3$	3



1 cycle



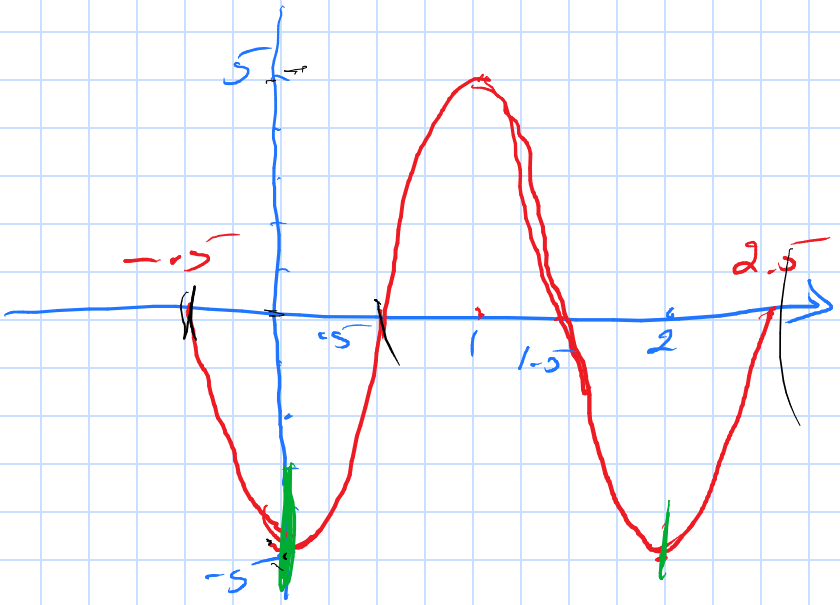
$y = A\sin(Bx+C)+D$
or
$y = A\cos(Bx+C+D)$

$P = \pi = \frac{2\pi}{B} \Rightarrow \underline{B=2}$ $\quad \phi = 0 \Rightarrow \underline{C=0}$

$|A| = 3$ $\quad y = 2 = D$

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

$\underline{0 \le x \le 2\pi}$



$|A| = 5$

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

$\phi = 0 \rightarrow C = 0$

V.T : $y = 0 = D$

$y = -5\cos(\pi x)$

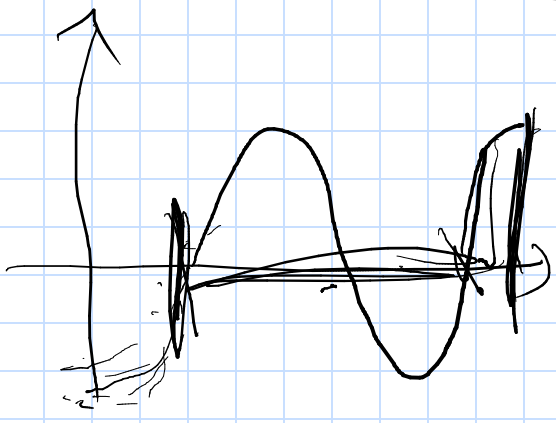
$-\frac{1}{2} \leq x \leq \frac{5}{2}$

$\phi = -\frac{1}{2} = -\frac{C}{B} = -\frac{C}{\pi}$

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

$y = -5\sin\left(\pi x + \frac{\pi}{2}\right)$

$-\frac{1}{2} \leq x \leq \frac{5}{2}$



#27 $y = 5\cos(2x + 2\pi) + 2$

$|A| = 5$ $\quad P = \frac{2\pi}{2} = \frac{2\pi}{2} = \pi$

$\phi = -\frac{C}{B} = -\frac{2\pi}{2} = -\pi$

V.T: $y = 2$

		x		y
0	$-\pi$	$-\pi$	$5 + 2$	7
$\frac{\pi}{4}$	$-\frac{3\pi}{4}$	$-\frac{3\pi}{4}$	$0 + 2$	2
$\frac{\pi}{2}$		$-\frac{\pi}{2}$	$-5 + 2$	-3
$\frac{3\pi}{4}$		$-\frac{\pi}{4}$	$0 + 2$	2
π		0	$5 + 2$	7