

1.

$$f(x) = 3 \sin 2x - 1$$

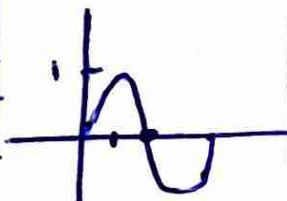
$$\boxed{\omega = 2 \quad \rho = 3 \quad c = -1}$$

$$T = \frac{2\pi}{\omega} = \frac{2\pi}{2} = \pi \Rightarrow \underline{\underline{T = \pi}}$$

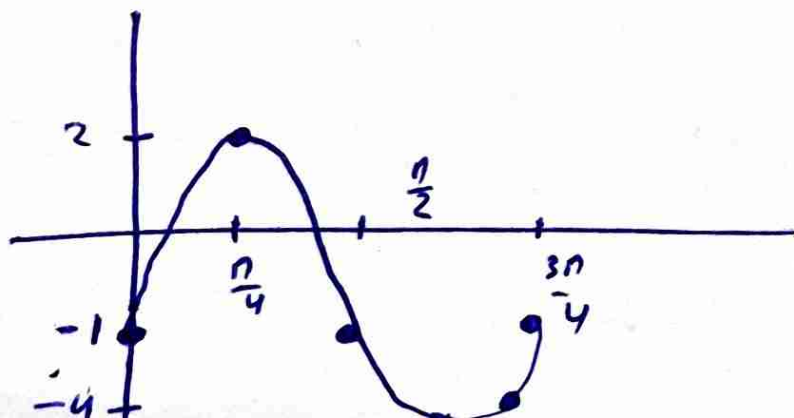
$$M = |\rho| + c = |3| - 1 = 3 - 1 = 2 \quad \underline{\underline{M = 2}}$$

$$m = -|\rho| + c = -|3| - 1 = -4 \quad \underline{\underline{m = -4}}$$

$2x$	0	$\frac{\pi}{4}$	$\frac{\pi}{2}$	$\frac{3\pi}{4}$	π
$\sin 2x$	0	1	0	-1	0
$3 \sin 2x$	0	3	0	-3	0
$f(x)$	-1	2	-1	-4	-1



Χωρίζω την περίοδο σε 4 κομμάτια.



2.

$$H(x) = -2 \cos \frac{x}{2} + 2$$

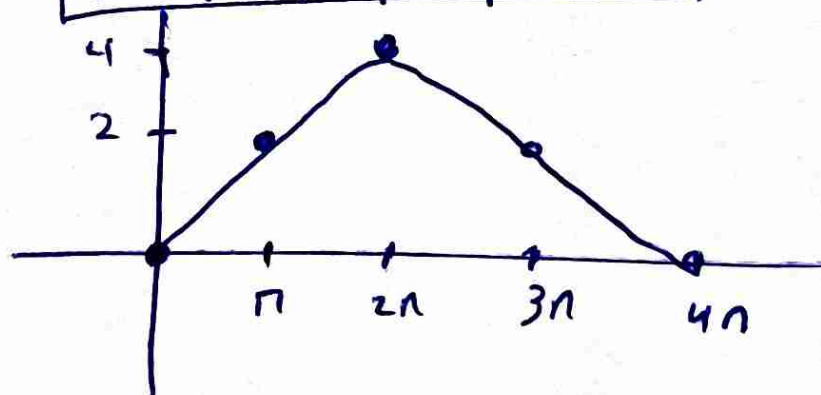
$$\boxed{\omega = \frac{1}{2} \quad \rho = -2 \quad c = 2}$$

$$T = \frac{2\pi}{\omega} = \frac{2\pi}{\frac{1}{2}} = 4\pi \Rightarrow \underline{\underline{T = 4\pi}}$$

$$M = |\rho| + c = |-2| + 2 = 2 + 2 = 4 \quad \underline{\underline{M = 4}}$$

$$m = -|\rho| + c = -|-2| + 2 = -2 + 2 = 0 \quad \underline{\underline{m = 0}}$$

$\frac{x}{2}$	0	π	2π	3π	4π
$\cos \frac{x}{2}$	1	0	-1	0	1
$-2 \cos \frac{x}{2}$	-2	0	2	0	-2
$H(x)$	0	2	4	2	0



37. $f(x) = \alpha \varepsilon \psi(21\pi + \pi\omega x) + \sigma \psi\left(\frac{13\pi}{2} - \pi\omega x\right)$

Ⓐ) Nδδ $f(x) = (\alpha + 1) \varepsilon \psi(\pi\omega x)$

• $\varepsilon \psi(21\pi + \pi\omega x) = \varepsilon \psi(\cancel{21\pi} + \pi + \pi\omega x) = \varepsilon \psi(\pi + \pi\omega x)$

$= \underline{\underline{\varepsilon \psi \pi\omega x}}$

• $\sigma \psi\left(\frac{13\pi}{2} - \pi\omega x\right) = \sigma \psi\left(\frac{12\pi}{2} + \frac{\pi}{2} - \pi\omega x\right) =$

$= \sigma \psi(\cancel{6\pi} + \frac{\pi}{2} - \pi\omega x) = \sigma \psi\left(\frac{\pi}{2} - \pi\omega x\right) =$

$= \underline{\underline{\varepsilon \psi(\pi\omega x)}}$

Apr $f(x) = \alpha \cdot \varepsilon \psi \pi\omega x + \varepsilon \psi \pi\omega x$

$f(x) = (\alpha + 1) \varepsilon \psi \pi\omega x$

Ⓑ) $\forall T=2$ και $A\left(\frac{1}{2}, 3\right) \in C_f$

$$T = \frac{\frac{\lambda_{\text{χολίο}}}{2\eta}}{\omega} \quad \text{απόφαση υπέρ και συν}$$

$$T = \frac{\pi}{\omega} \quad \text{απόφαση εφχ.}$$

$$T=2 \Rightarrow \frac{\pi}{\pi\omega} = 2 \Rightarrow \frac{1}{\omega} = 2$$

$$\omega = \frac{1}{2}$$

$$f(x) = (a+1) \varepsilon \varphi \pi \cdot \frac{1}{2} x$$

$$f(x) = (a+1) \varepsilon \varphi \frac{\pi}{2} x$$

$$f\left(\frac{1}{2}\right) = 3 \Rightarrow (a+1) \varepsilon \varphi \frac{\pi}{2} \frac{1}{2} = 3$$

$$(a+1) \varepsilon \varphi \frac{\pi}{4} = 3$$

$$a+1 = 3$$

$$\underline{\underline{a=2}}$$

$$f(x) = 3 \varepsilon \varphi \frac{\pi}{2} x$$

$$11). f(x) = \frac{\varepsilon\varphi^2 \frac{19n}{3}}{\varepsilon\varphi nx}$$

$$\varepsilon\varphi x \sigma\varphi x = 1$$

$$\sigma\varphi x = \frac{1}{\varepsilon\varphi x}$$

$$3 \varepsilon\varphi \frac{nx}{2} = \frac{\varepsilon\varphi^2 \frac{19n}{3}}{\varepsilon\varphi nx}$$

$$\bullet \varepsilon\varphi \frac{19n}{3} = \varepsilon\varphi \left(\frac{18n}{3} + \frac{n}{3} \right) = \varepsilon\varphi \frac{n}{3} = \sqrt{3}$$

$$3 \varepsilon\varphi \frac{nx}{2} = \frac{\sqrt{3}^2}{\varepsilon\varphi nx}$$

$$3 \varepsilon\varphi \frac{nx}{2} = \frac{3}{\varepsilon\varphi nx}$$

$$\varepsilon\varphi \frac{nx}{2} = \frac{1}{\varepsilon\varphi nx}$$

$$\varepsilon\varphi \frac{nx}{2} = \sigma\varphi nx$$

$$\varepsilon\varphi \frac{nx}{2} = \varepsilon\varphi \left(\frac{n}{2} - x \right)$$

$$\frac{nx}{2} = \frac{n}{2} - x \Rightarrow nx = 2\frac{n}{2} + n - 2x$$

$$2x + nx = 2\frac{n}{2} + n$$

$$x(2+n) = 2\frac{n}{2}$$

ΕΥΟΤΗΤΑ 13

35 $f(x) = 1 + 2.5\omega \frac{x}{3}$

$$f(x) = \rho \sin \omega x + c$$

$$T = \frac{2\pi}{\omega}$$

$$\text{Max} : |\rho| + c$$

$$\text{Min} : -|\rho| + c$$

(a) $T = \frac{2\pi}{\omega} = \frac{2\pi}{\frac{1}{3}} = 6\pi$

$$M = |\rho| + c = |2| + 1 = 2 + 1 = 3$$

$$\omega = \frac{1}{3} \quad \rho = 2$$

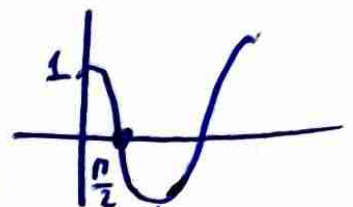
$$c = 1$$

$$m = -|\rho| + c = -|2| + 1 = -2 + 1 = -1$$

(3)
(4)

$\frac{x}{3}$	0	$\frac{3\pi}{2}$	3π	$\frac{9\pi}{2}$	6π
$\sin \frac{x}{3}$	1	0	-1	0	1
$2.5\omega \frac{x}{3}$	2	0	-2	0	2
$f(x)$	3	1	-1	1	3

$$T = 6\pi$$



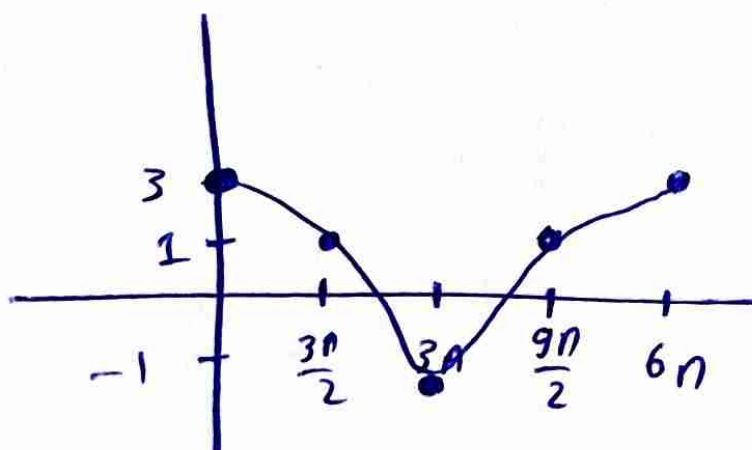
Χωρίζω το 6π στο 4

$$\frac{6\pi}{4} = \frac{3\pi}{2}$$

$$\frac{6\pi}{2} = 3\pi$$

$$\frac{9\pi}{2}$$

$$\frac{12\pi}{2} = 6\pi$$



$$⑥ \quad f\left(\frac{3n}{2} - x\right) + n\mu \frac{x}{3} = 4$$

$$\boxed{f(x) = 1 + 2\sigma\omega \frac{x}{3}}$$

$$f\left(\frac{3n}{2} - x\right) = 1 + 2\sigma\omega \left(\frac{\frac{3n}{2} - x}{3}\right) = 1 + 2\sigma\omega \left(\frac{\frac{3n}{2}}{3} - \frac{x}{3}\right)$$

$$= 1 + 2\sigma\omega \left(\frac{3n}{6} - \frac{x}{3}\right) = 1 + 2\sigma\omega \left(\frac{n}{2} - \frac{x}{3}\right)$$

$$= 1 + 2n\mu \frac{x}{3}$$

$$1 + 2n\mu \frac{x}{3} + n\mu \frac{x}{3} = 4$$

$$3n\mu \frac{x}{3} = 3$$

$$n\mu \frac{x}{3} = 1$$

$$n\mu \frac{x}{3} = n\mu \frac{n}{2}$$

$$\frac{x}{3} = 2kn + \frac{n}{2}$$

$$\boxed{x = 6kn + \frac{3n}{2}}$$

$$\therefore \frac{x}{3} = 2kn + n - \frac{n}{2}$$

$$\boxed{\frac{x}{3} = 2kn + \frac{n}{2}}$$

B6. $f(x) = \alpha \eta \mu(3\eta - \omega x) + \alpha \sigma \omega / \frac{\eta}{2} - \omega x$

① NDO $f(x) = 2\alpha \eta \mu \omega x$

• $\eta \mu(3\eta - \omega x) = \eta \mu(\cancel{2\eta} + \eta - \omega x) = \eta \mu(\eta - \omega x) = \eta \mu \omega x$

• $\sigma \omega / \frac{\eta}{2} - \omega x = \eta \mu \omega x$

Apr $f(x) = \alpha \cdot \eta \mu \omega x + \alpha \eta \mu \omega x$

$f(x) = 2\alpha \eta \mu \omega x$

② $\subseteq \sigma \tau \omega$ $T = \eta$ και $A(\frac{1}{12}, -\frac{3}{2}) \in (f$

i) vdo $f(x) = -3\eta \mu 2x$

$T = \frac{2\eta}{\omega} \Leftrightarrow \cancel{\eta} = \frac{2\cancel{\eta}}{\omega} \Rightarrow \underline{\underline{\omega = 2}}$

$f(\frac{1}{12}) = 2\alpha \eta \mu 2 \frac{1}{12} = -\frac{3}{2}$

$2\alpha \eta \mu \frac{1}{6} = -\frac{3}{2}$

$\cancel{\frac{2\alpha}{2}} = -\frac{3}{2}$

$\alpha = -\frac{3}{2}$

$f(x) = 2(-\frac{3}{2}) \mu \mu 2x$

$f(x) = -3\eta \mu 2x$

$$11) f(x) = -3np2x$$

$$\text{Max} = |p| + c = |-3| = 3$$

$$\text{Min} = -|p| + c = -3$$

$$f(x) = 3$$

$$-3np2x = 3$$

$$np2x = -1$$

$$np2x = -np \frac{n}{2}$$

$$np2x = np(-\frac{n}{2})$$

$$2x = 2kn - \frac{n}{2}$$

$$\therefore 2x = 2kn + n + \frac{n}{2}$$

$$x = kn + \frac{n}{2} + \frac{n}{4}$$

$$\boxed{x = kn - \frac{n}{4}}$$

$$\boxed{x = kn + \frac{3n}{4}}$$

$$f(x) = -3$$

$$-3np2x = -3$$

$$np2x = 1$$

$$np2x = np \frac{n}{2}$$

$$2x = 2kn + \frac{n}{2} \quad \therefore 2x = 2kn + n - \frac{n}{2}$$

$$\boxed{x = kn + \frac{n}{4}}$$

$$\text{iii) } f(x) = \frac{3}{\sqrt{2}}$$

$$-3 \sin 2x = \frac{3}{\sqrt{2}}$$

$$\sin 2x = -\frac{3}{3\sqrt{2}}$$

$$\sin 2x = -\frac{1}{\sqrt{2}} = -\frac{\sqrt{2}}{2}$$

$$\sin 2x = -\frac{\sqrt{2}}{2}$$

$$\sin 2x = -\sin \frac{\pi}{4}$$

$$\sin 2x = \sin -\frac{\pi}{4}$$

$$2x = 2k\pi - \frac{\pi}{4}$$

$$x = k\pi - \frac{\pi}{8}$$

$$\text{iv) } 2x = 2k\pi + \pi - \left(-\frac{\pi}{4}\right)$$

$$2x = 2k\pi + \pi + \frac{\pi}{4}$$

$$x = k\pi + \frac{\pi}{2} + \frac{\pi}{8}$$

$$x = k\pi + \frac{5\pi}{8}$$

14).

$2x$	0	$\frac{\pi}{4}$	$\frac{\pi}{2}$	$\frac{3\pi}{4}$	π
$\sin 2x$	0	1	0	-1	0
$f(x)$	0	-3	0	3	0

$$f(x) = -3 \sin 2x$$

