

#17

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

$$A=1, B=1, C=\pi$$

1) amplitude: $|A| = 1$ range: $[-1, 1]$

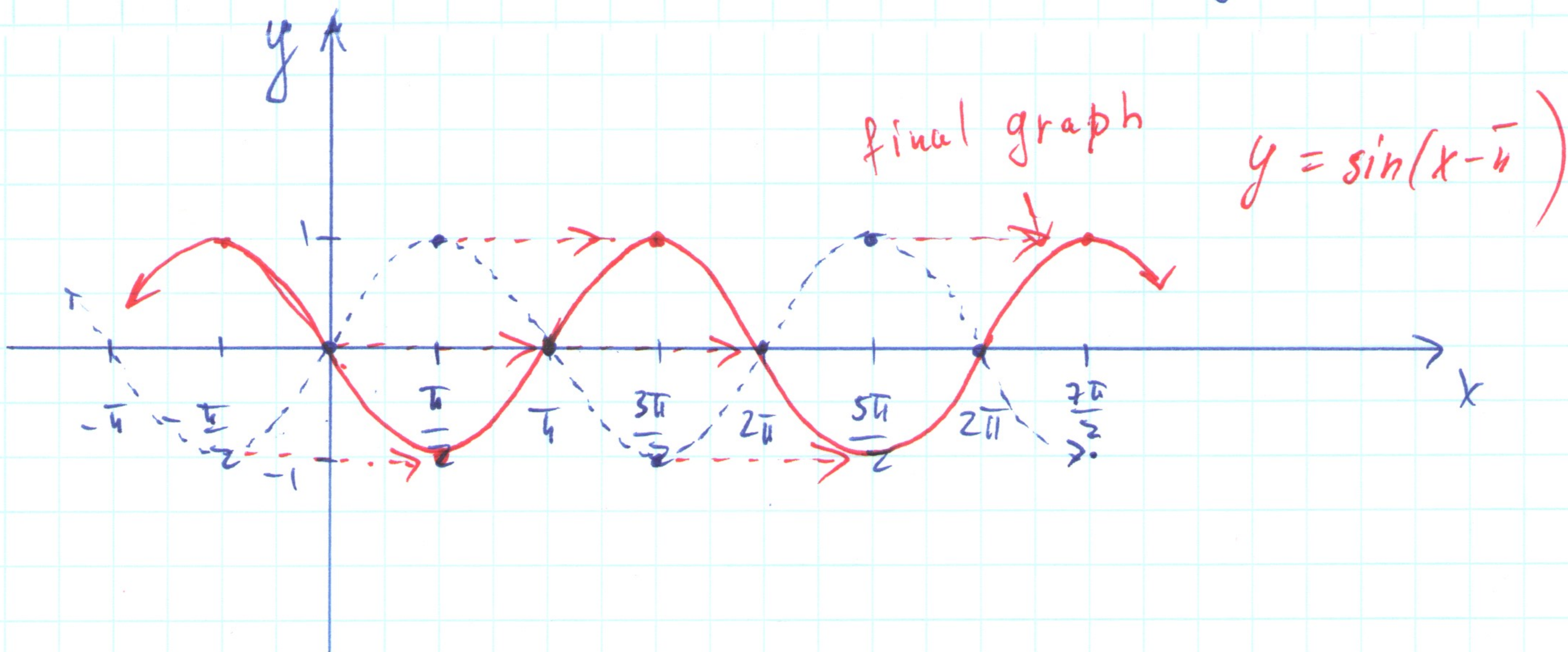
2) period: $\frac{2\pi}{B} = \frac{2\pi}{1} = 2\pi$

3) 5 key points: $0, \frac{\text{period}}{4}, \frac{\text{period}}{2}, \frac{3 \text{ periods}}{4}, \text{period}$

x values: $0, \frac{2\pi}{4} = \frac{\pi}{2}, \frac{2\pi}{2} = \pi, \frac{3 \cdot 2\pi}{4} = \frac{3\pi}{2}, 2\pi$

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

4) shift: $\frac{C}{B} = \frac{\pi}{1} = \pi > 0$ shift all 5 point π units to the right



#19

$$y = \sin(2x - \pi)$$

$$A = 1, B = 2, C = \pi$$

1) amplitude: $|A| = 1$ range: $[-1, 1]$

2) period: $\frac{2\pi}{B} = \frac{2\pi}{2} = \pi$

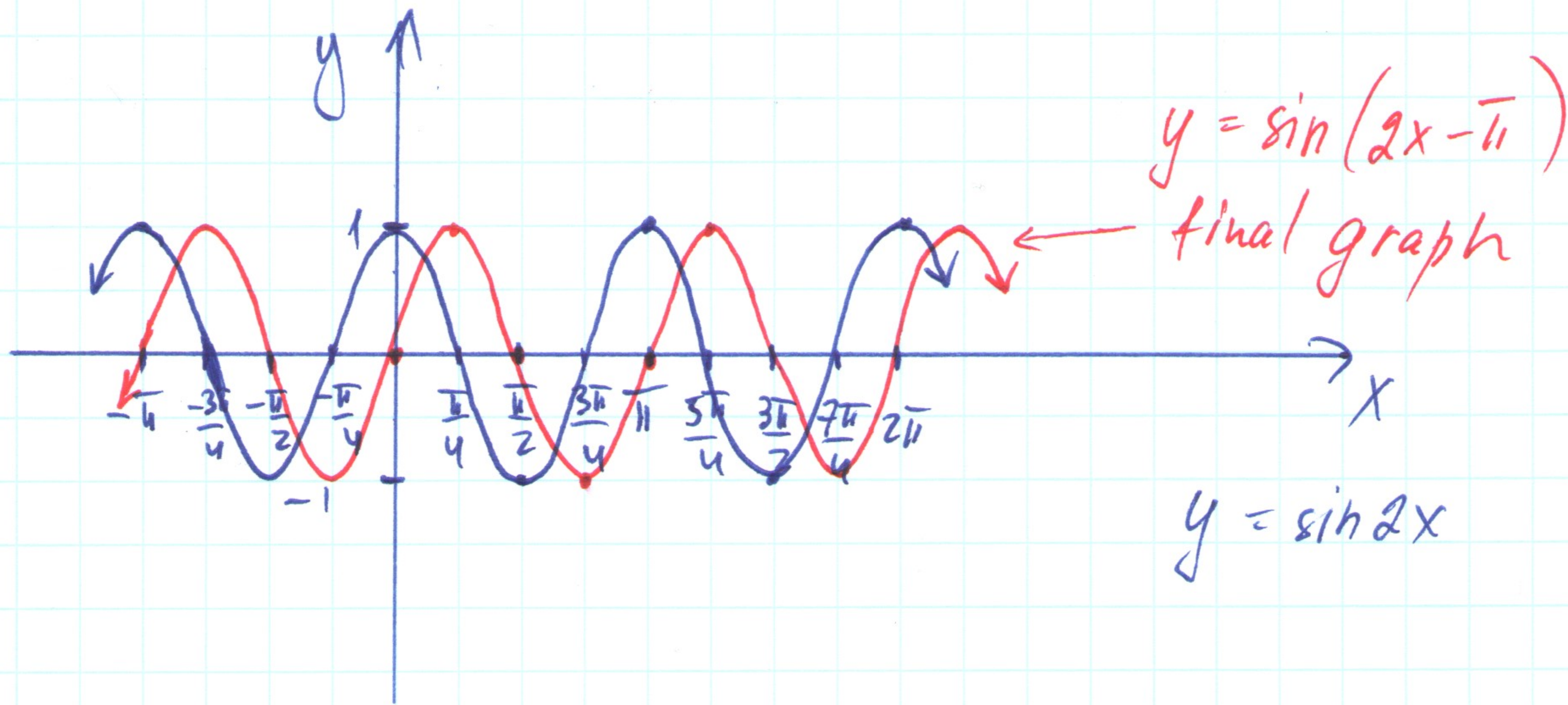
3) 5 key points:

x-values: $0, \frac{\text{period}}{4}, \frac{\text{period}}{2}, \frac{3\text{periods}}{4}, \text{period}$

$0, \frac{\pi}{4}, \frac{\pi}{2}, \frac{3\pi}{4}, \pi$

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

4) shift: $\frac{C}{B} = \frac{\pi}{2} > 0$ shift $\frac{\pi}{2}$ units to the right



#47

$$y = \frac{1}{2} \cos\left(3x + \frac{\pi}{2}\right)$$

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

$$B = 3$$

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

1) amplitude: $|A| = \frac{1}{2}$ range: $[-\frac{1}{2}, \frac{1}{2}]$

2) period: $\frac{2\pi}{B} = \frac{2\pi}{3}$

3) 5 key points:

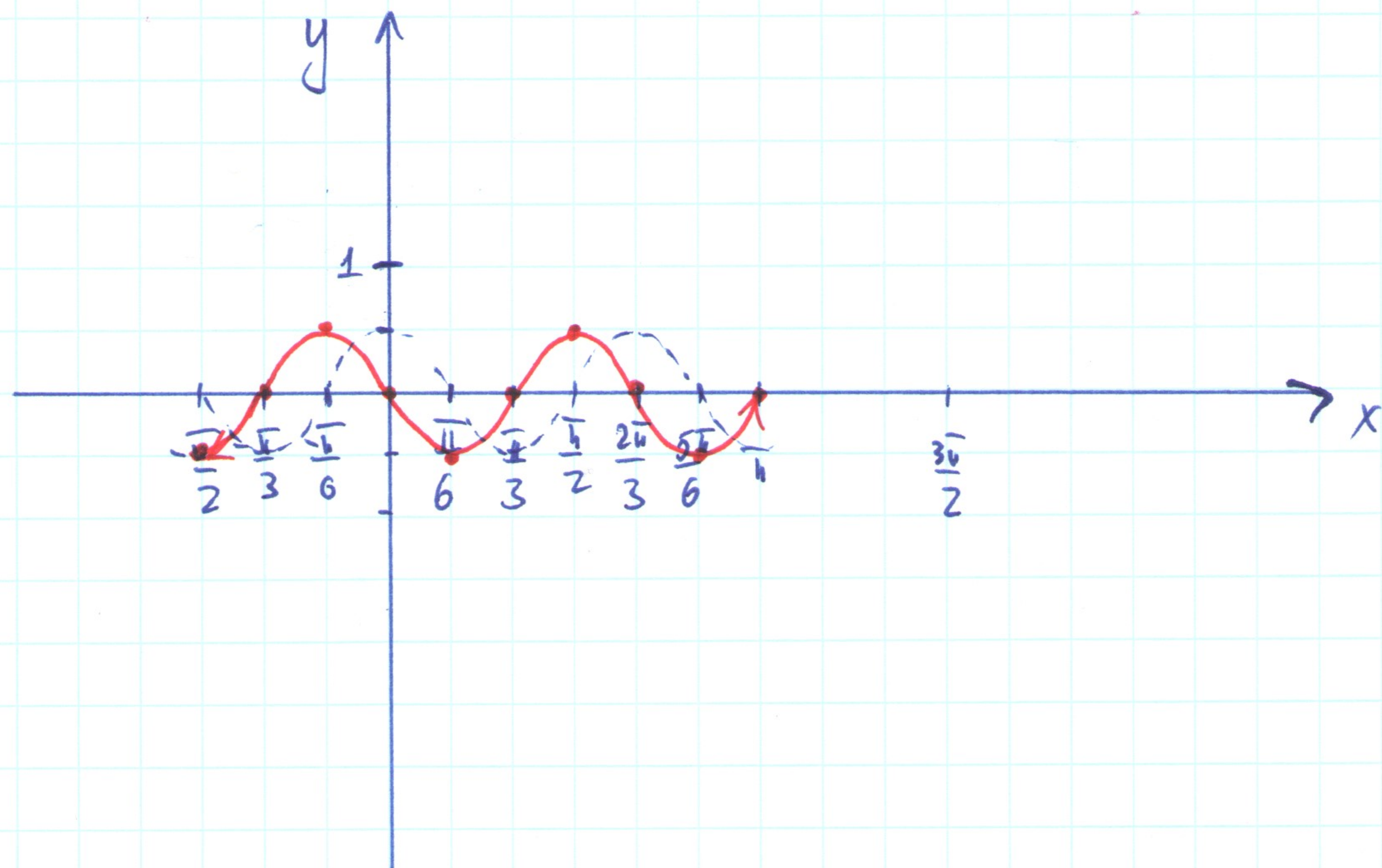
x-values: 0, $\frac{\text{period}}{4}$, $\frac{\text{period}}{2}$, $\frac{3 \text{ periods}}{4}$, period

$0, \frac{\frac{2\pi}{3}}{4} = \frac{\pi}{6}, \frac{\frac{2\pi}{3}}{2} = \frac{\pi}{3}, \frac{3 \cdot \frac{2\pi}{3}}{4} = \frac{\pi}{2}, \frac{2\pi}{3}$

x	0	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$
$\frac{1}{2} \cos(3x)$	$\frac{1}{2}$	0	$-\frac{1}{2}$	0	$\frac{1}{2}$

4) shift: $\frac{C}{B} = \frac{-\frac{\pi}{2}}{3} = -\frac{\pi}{6} < 0$

$\frac{\pi}{6}$ units to the left



#49

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

$$A = -3, \quad B = 2, \quad C = \frac{\pi}{2}$$

1) amplitude: $|A| = 3$ range: $[-3, 3]$

2) period: $\frac{2\pi}{B} = \frac{2\pi}{2} = \pi$

3) 5 key points:

x-values: $0, \frac{\text{period}}{4}, \frac{\text{period}}{2}, \frac{3 \text{ periods}}{4}, \text{period}$

$0, \frac{\pi}{4}, \frac{\pi}{2}, \frac{3\pi}{4}, \pi$

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

4) shift: $\frac{C}{B} = \frac{\frac{\pi}{2}}{2} = \frac{\pi}{4} > 0$

$\frac{\pi}{4}$ units to the right

