

Graphing Sin/Cos

Graph each function using radians.

1) $y = \frac{1}{2} \cdot \sin 3\theta - 1$

Period: $\frac{2\pi}{B} = \frac{2\pi}{3}$

Interval: $\frac{\text{Period}}{4} = \frac{2\pi}{3} \cdot \frac{1}{4} = \frac{2\pi}{12} = \frac{\pi}{6}$

vertical shift: **down 1**

Phase shift: **None**

X-scale: $\frac{\pi}{6}$

| θ | y |
|-----------------|----------------|
| 0 | 0 |
| $\frac{\pi}{6}$ | $\frac{1}{2}$ |
| $\frac{\pi}{3}$ | 0 |
| $\frac{\pi}{2}$ | $-\frac{1}{2}$ |
| $2\pi/3$ | 0 |

2) $y = 3\cos \frac{\theta}{4} + 2$

Period: $\frac{2\pi}{\frac{1}{4}} = \frac{2\pi \cdot 4}{1} = 8\pi$

Interval: $\frac{8\pi}{4} = 2\pi$

vertical shift: **up 2**

Phase shift: **none**

X-scale: 2π

| θ | y |
|----------|-----|
| 0 | 3 |
| 2π | 0 |
| 4π | -3 |
| 6π | 0 |
| 8π | 3 |

3) $y = 2\sin \left(\theta + \frac{\pi}{3} \right)$

Period: $\frac{2\pi}{1} = 2\pi$

Interval: $\frac{2\pi}{4} = \frac{\pi}{2}$

vertical shift: **none**

Phase shift: $\frac{\pi}{3}$ left

X-scale: $\frac{\pi}{6}$

| θ | y |
|-----------------|-----|
| 0 | 0 |
| $\frac{\pi}{2}$ | 2 |
| π | 0 |
| $3\pi/2$ | -2 |
| 2π | 0 |

4) $y = \frac{1}{2} \cdot \cos \left(\theta - \frac{3\pi}{4} \right)$

Period: $\frac{2\pi}{1} = 2\pi$

Interval: $\frac{2\pi}{4} = \frac{\pi}{2}$

vertical shift: **none**

Phase shift: $3\pi/4$ right

X-scale: $\frac{\pi}{4}$

| θ | y |
|-----------------|----------------|
| 0 | $\frac{1}{2}$ |
| $\frac{\pi}{2}$ | 0 |
| π | $-\frac{1}{2}$ |
| $3\pi/2$ | 0 |
| 2π | $\frac{1}{2}$ |

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

Period: $\frac{2\pi}{2} = \pi$

Interval: $\frac{\pi}{4}$

vertical shift: **up 1**

Phase shift: $\frac{C}{B} = \frac{\frac{\pi}{2}}{2} = \frac{\pi}{2} \cdot \frac{1}{2} = \frac{\pi}{4}$ left

X-scale: $\frac{\pi}{4}$

| θ | y |
|-----------------|-----|
| 0 | 3 |
| $\frac{\pi}{4}$ | 0 |
| $\frac{\pi}{2}$ | -3 |
| $3\pi/4$ | 0 |
| π | 3 |

6) $y = 4\sin \left(3\theta - \frac{3\pi}{4} \right) + 2$

Period: $\frac{2\pi}{3}$

Interval: $\frac{2\pi}{3} \cdot \frac{1}{4} = \frac{2\pi}{12} = \frac{\pi}{6}$

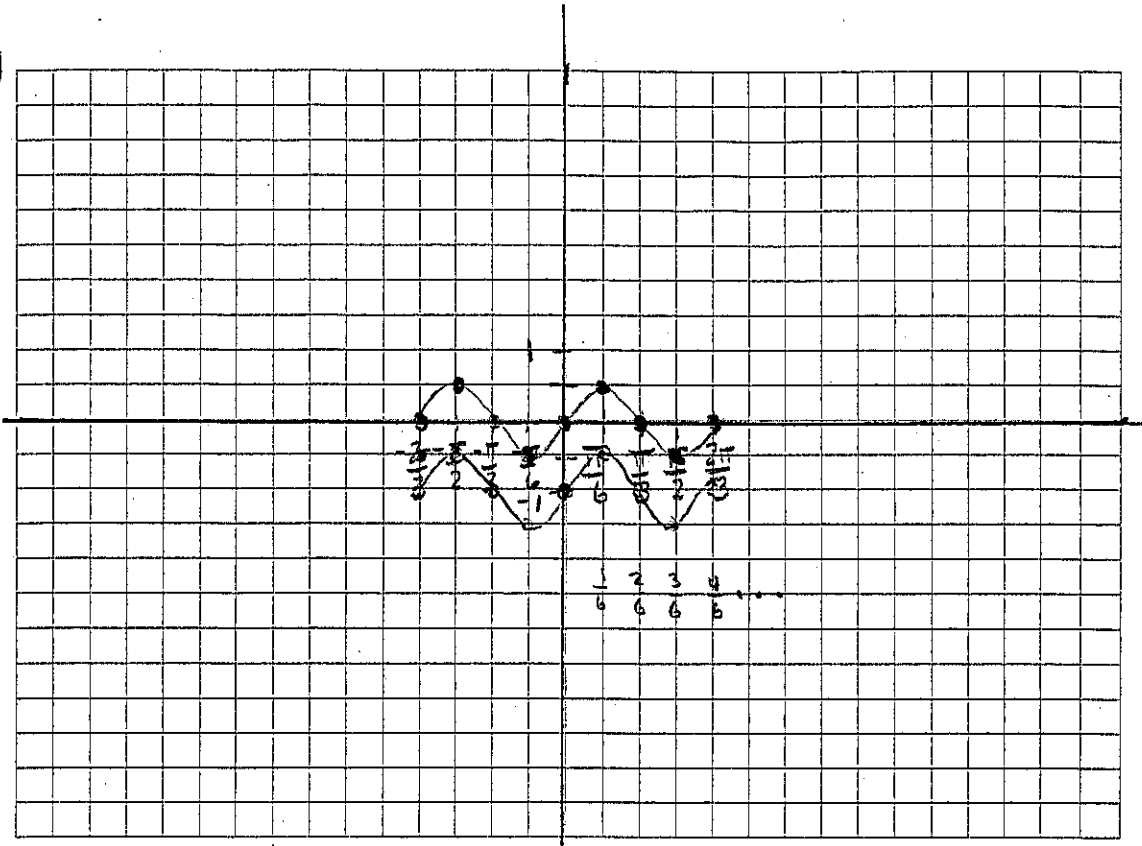
vertical shift: **up 2**

Phase shift: $\frac{3\pi}{4} = \frac{3\pi}{4} \cdot \frac{1}{3} = \frac{3\pi}{12} = \frac{\pi}{4}$ right

X-scale: $\frac{\pi}{12}$

| θ | y |
|-----------------|-----|
| 0 | 0 |
| $\frac{\pi}{6}$ | 4 |
| $\frac{\pi}{3}$ | 0 |
| $\frac{\pi}{2}$ | -4 |
| $2\pi/3$ | 0 |

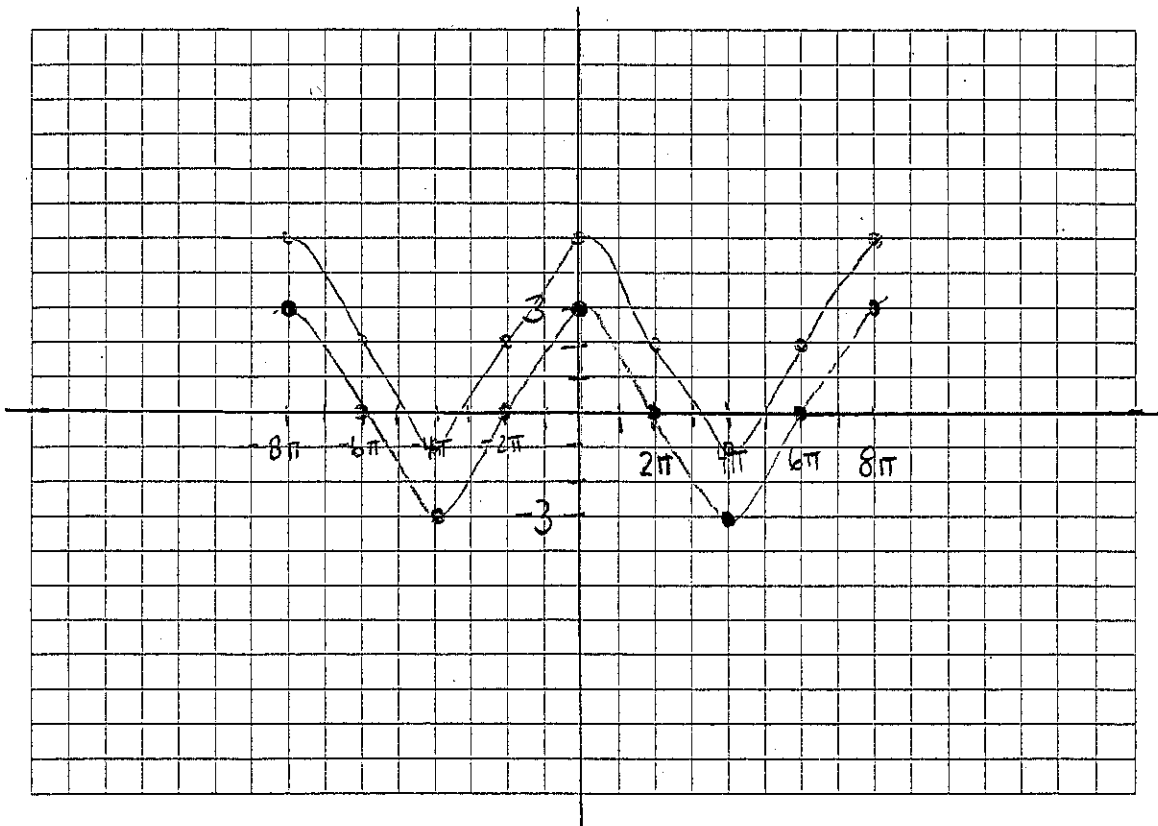
①



• down 1

Graphing Sin/Cos

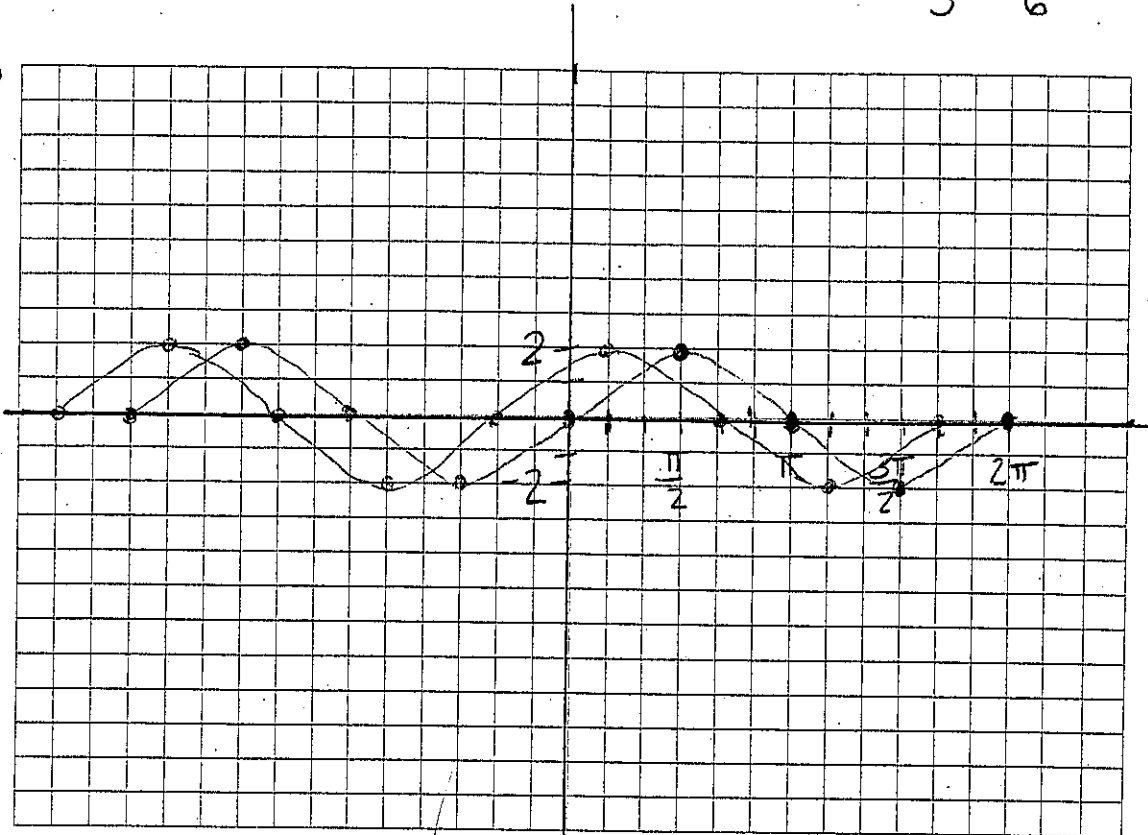
②



• UP 2

• $\frac{\pi}{3} = \frac{2\pi}{6}$ (2 spaces left)

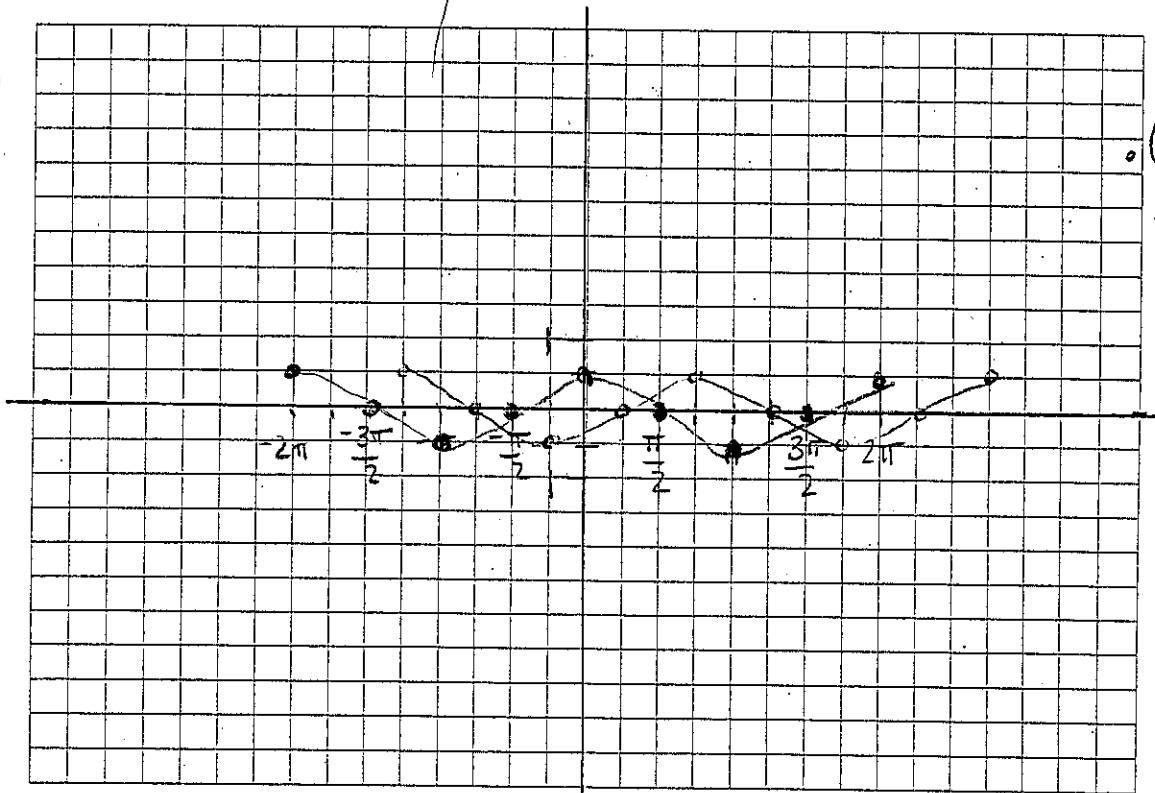
3.



$\frac{1}{6} \frac{2}{6} \frac{3}{6} \frac{4}{6} \frac{5}{6} \frac{6}{6} \frac{7}{6} \frac{8}{6} \frac{9}{6} \dots$

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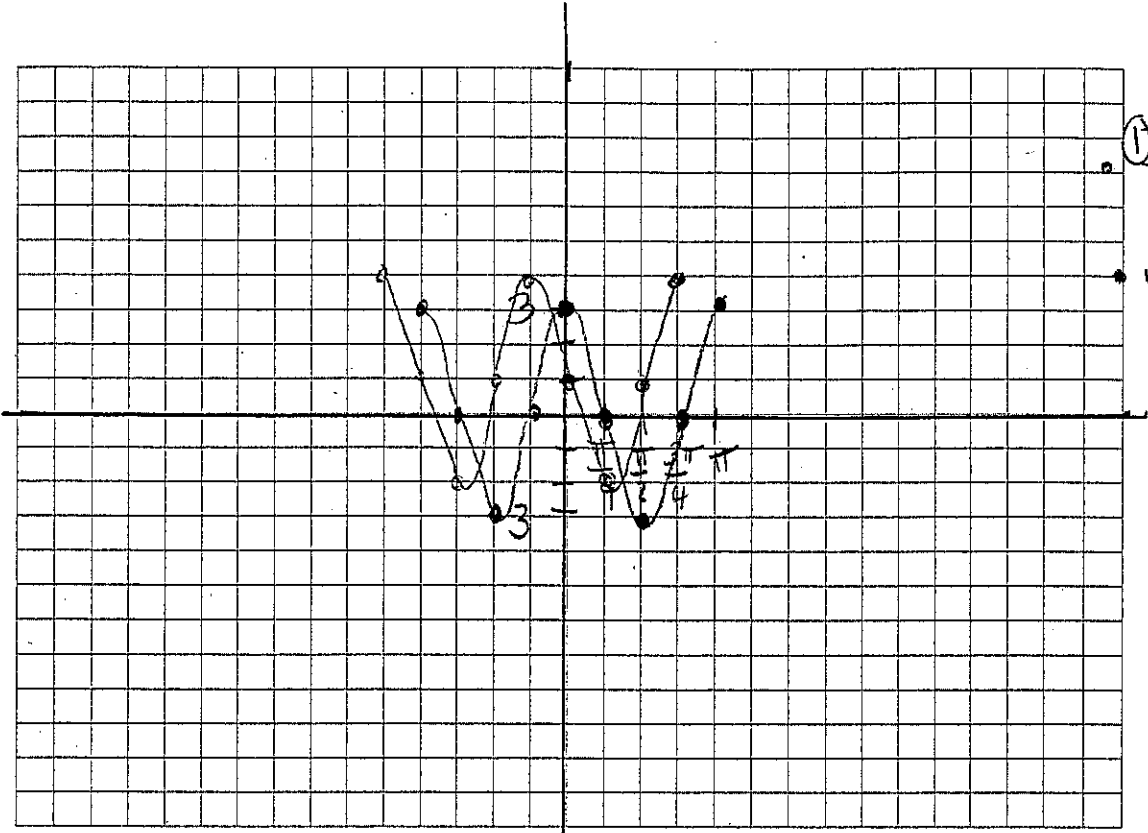
4.



• $\frac{3\pi}{4}$ (3 spaces to the left)

$\frac{1}{4} \frac{2}{4} \frac{3}{4} \frac{4}{4} \dots$

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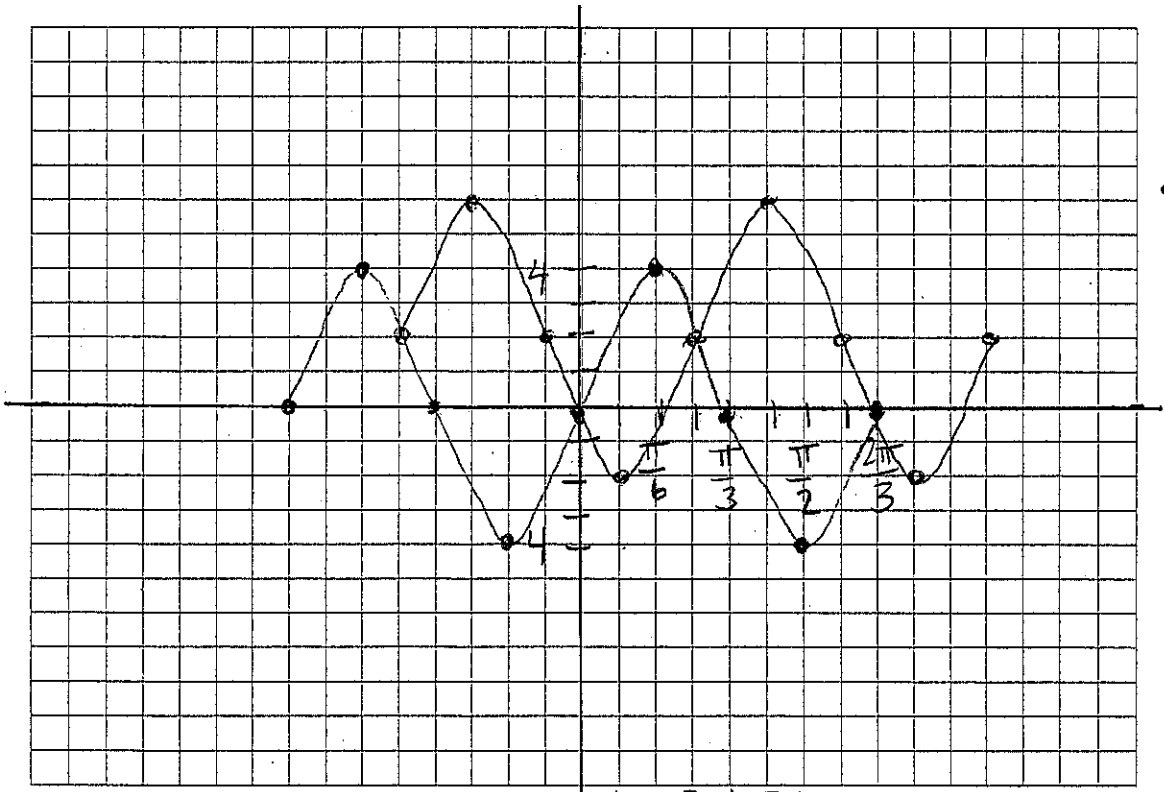


$\frac{\pi}{4}$ (1 space left)
UP 1

$\frac{1}{4} \quad \frac{2}{4} \quad \frac{3}{4} \quad \frac{4}{4}$

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$\frac{\pi}{4} = \frac{3\pi}{12}$ (3 space right)

UP 2

$\frac{1}{12} \quad \frac{2}{12} \quad \frac{3}{12} \quad \frac{4}{12} \quad \frac{5}{12} \quad \frac{6}{12} \dots$