

Part 2: Cosine Graphs with Dilations

Without graphing, describe in words the relationship between each pair of graphs. Include in your explanation differences you might notice in amplitude, period, reflection, etc. (Use appropriate vocabulary!)

12) $f(x) = \cos 2x$ and $g(x) = -\cos 2x$

$g(x)$ is a reflection over the x-axis; both functions have 2 cycles in 2π

13) $f(x) = \cos x$ and $g(x) = -5 \cos x$

$g(x)$ is a reflection over the x-axis and has an amplitude of 5

14) $f(x) = \cos x$ and $g(x) = \cos\left(-\frac{x}{2}\right)$

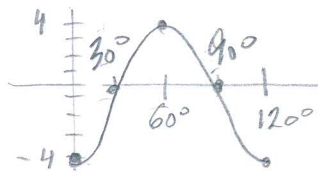
$g(x)$ is a reflection over the y-axis and has a period of 4π

State the amplitude and period for each of the following functions. Then graph one complete period of each, remembering to label the tick divisions and both your horizontal axis and vertical axis. Also state the domain and range of one period using interval notation.

*** Remember: $\theta \rightarrow$ degrees and $x \rightarrow$ radians.

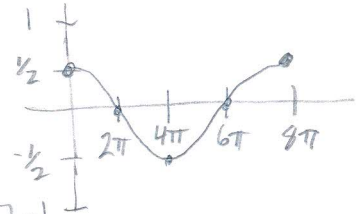
15) $y = -4 \cos 3\theta$

amp: 4
period: 120°
dom: $[0, 120^\circ]$
range: $[-4, 4]$



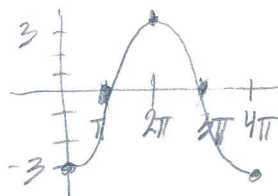
16) $y = \frac{1}{2} \cos \frac{x}{4}$

amp: $\frac{1}{2}$
period: 8π
dom: $[0, 8\pi]$
range: $[-\frac{1}{2}, \frac{1}{2}]$



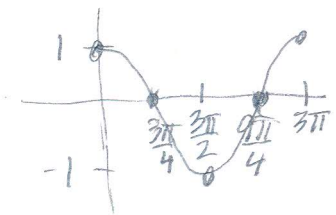
17) $y = -3 \cos\left(-\frac{1}{2}x\right) = 3 \cos\left(\frac{1}{2}x\right)$

amp: 3
period: 4π
domain: $[0, 4\pi]$
range: $[-3, 3]$



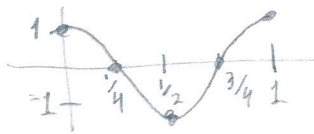
18) $y = \cos\left(-\frac{2}{3}x\right) = \cos\left(\frac{2}{3}x\right)$

amp: 1
period: 3π
domain: $[0, 3\pi]$
range: $[-1, 1]$



19) $y = \cos 2\pi x$

amp: 1
period: 1
dom: $[0, 1]$
range: $[-1, 1]$



20) $y = -10 \cos\left(\frac{\pi}{5}x\right)$

amp: 10
period: 10
dom: $[0, 10]$
range: $[-10, 10]$

