S1.6 #5 [1-8 All], 15-37, 45*, 57-64 All, 69, 70, 85

*Don't need grapher

S1.5 # 53,

See #62 in e-mail

We don't know the "move" for going from

① $\sin\left(\frac{\pi}{3}x\right)$ to $\sin\left(\frac{\pi}{3}x+\pi\right)=g(x)$

Replacing $\frac{\pi}{3}x$ with $\frac{\pi}{3}x+\pi$ $\qquad \frac{\pi}{\frac{\pi}{3}}=3$

② $\sin(x+\pi)$ to $\sin\left(\frac{\pi}{3}x+\pi\right)$

Replacing $x+\pi$ by $\frac{\pi}{3}x+\pi$

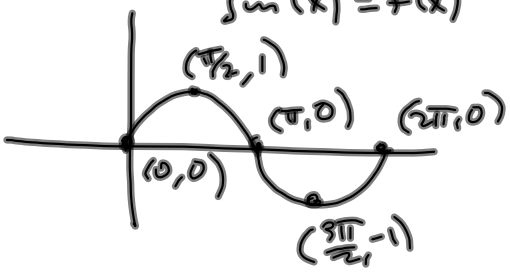
Here's the moves:

$\sin(x) \longmapsto \sin\left(\frac{\pi}{3}x\right) \longmapsto \sin\left(\frac{\pi}{3}(x+3)\right)$

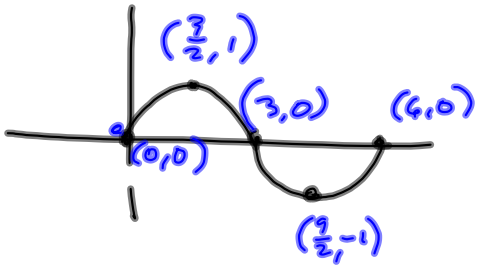
$(x,y) \longmapsto \left(\frac{3}{\pi}x, y\right) \longmapsto (x-3, y)$

Relative to previous picture

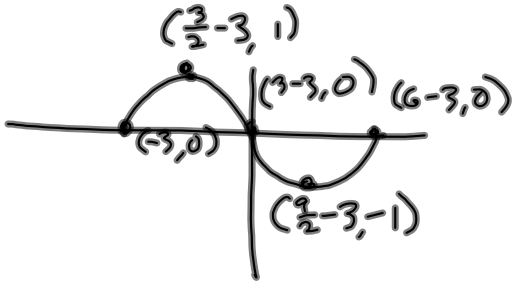
$\sin(x)=f(x)$



$\sin\left(\frac{\pi}{3}x\right)=f\left(\frac{\pi}{3}x\right)$



$g(x)=\sin\left(\frac{\pi}{3}(x+3)\right)=\sin\left(\frac{\pi}{3}x+\pi\right)=f\left(\frac{\pi}{3}(x+3)\right)$



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

$\frac{3}{\pi}\cdot\pi$

$\frac{3\pi}{2}\cdot\frac{3}{\pi}$

This is from Wednesday evening

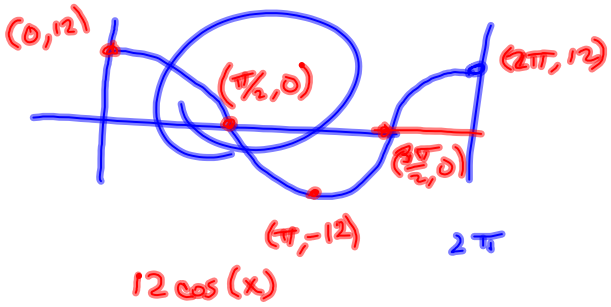
$12\cos\left(\frac{\pi}{3}x - 5\right) + 11$

$\frac{\pi}{3}x - 5 = \frac{\pi}{3}\left(x - \frac{15}{\pi}\right)$ $\quad \frac{5}{\frac{\pi}{3}}$

$\cos(x) \longrightarrow 12\cos(x) \longrightarrow 12\cos\left(\frac{\pi}{3}\left(x - \frac{15}{\pi}\right)\right)$

$\longrightarrow 12\cos\left(\frac{\pi}{3}x\right) \longrightarrow$

$\longrightarrow 12\cos\left(\frac{\pi}{3}\left(x - \frac{15}{\pi}\right)\right)$



$\frac{\pi}{3}x$ changes faster than x so $\cos\frac{\pi}{3}x$ changes faster shrinks graph towards y-axis

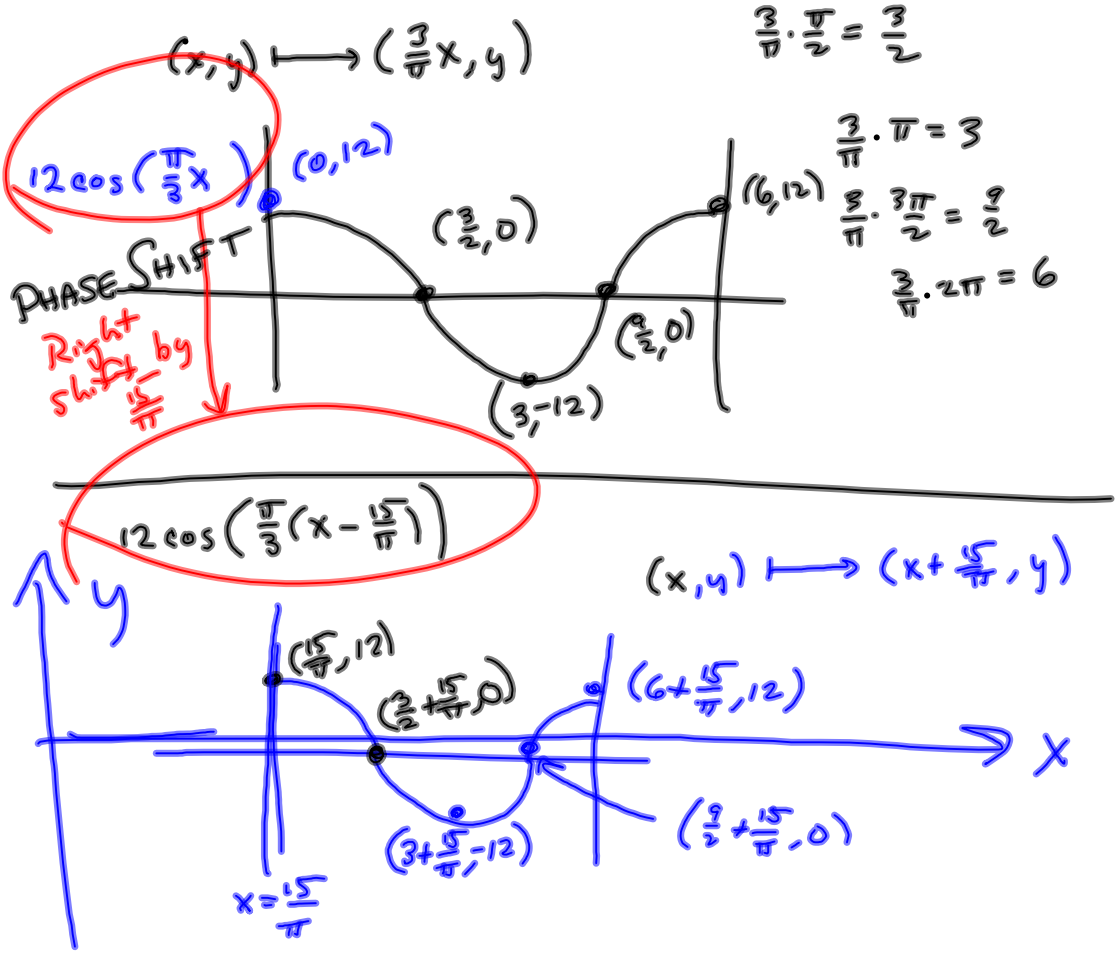
$(x,y) \longmapsto \left(\frac{3}{\pi}x, y\right)$

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

$\frac{3}{\pi}\cdot\pi = 3$

$\frac{3}{\pi}\cdot\frac{3\pi}{2} = \frac{9}{2}$

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



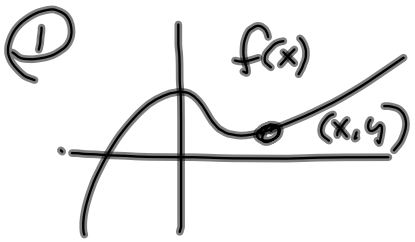
$f(x)$ (x,y)

$af(x)$

$f(bx)$

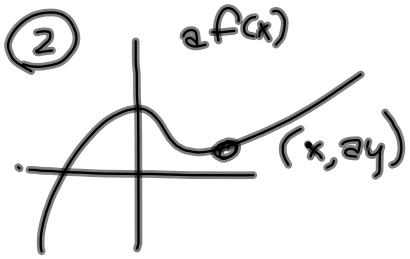
$f(x+c)$

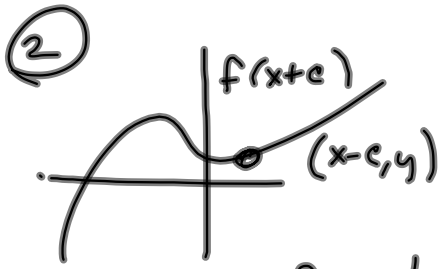
$f(x)+d$

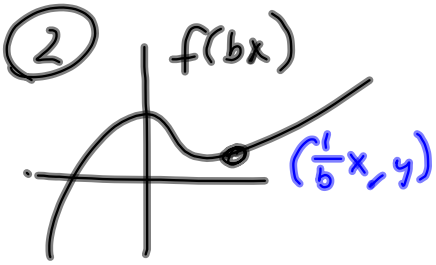


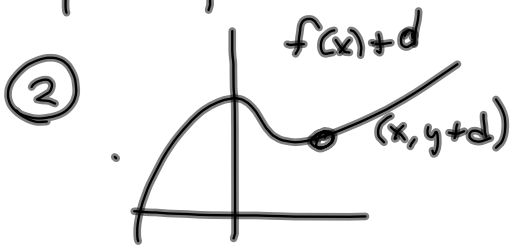
$\times 3$

$3x$









I Stretches

II Shifts

§1.5 #5

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

ONE PERIOD!

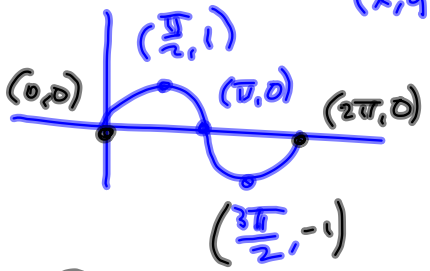
① $\sin(x)$ ⟶ ② $-\sin(x)$ ⟶ $-\sin\left(\frac{2\pi}{3}x\right)$

$(x,y) \longrightarrow (x,-y)$

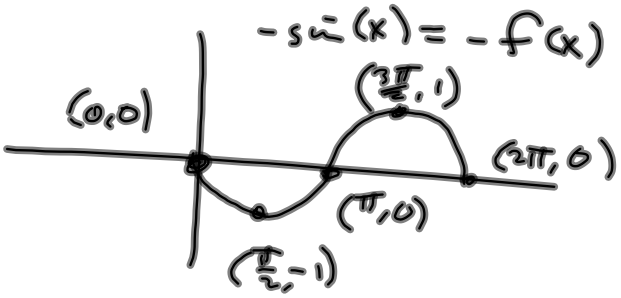
$(x,y) \longmapsto \left(\frac{3}{2\pi}x, y\right)$

$\longrightarrow -\sin\left(\frac{2\pi}{3}x\right) + 2$

$(x,y) \longmapsto (x, y+2)$

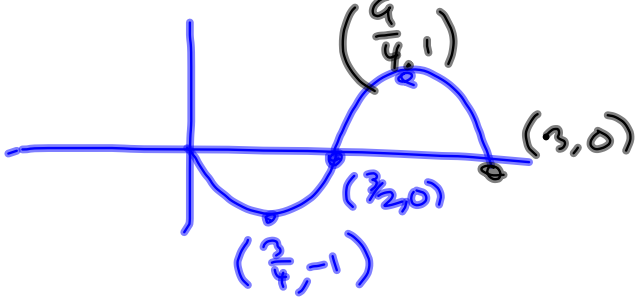


$f(x) = \sin(x)$



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

$-\sin\left(\frac{2\pi}{3}x\right) = -f\left(\frac{2\pi}{3}x\right)$ $\quad \frac{3}{2\pi} \cdot \pi = \frac{3}{2}$



$\frac{3}{2\pi} \cdot \frac{3\pi}{2} = \frac{9}{4}$

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

$-\sin\left(\frac{2\pi}{3}x\right) + 2 = -f\left(\frac{2\pi}{3}x\right) + 2$