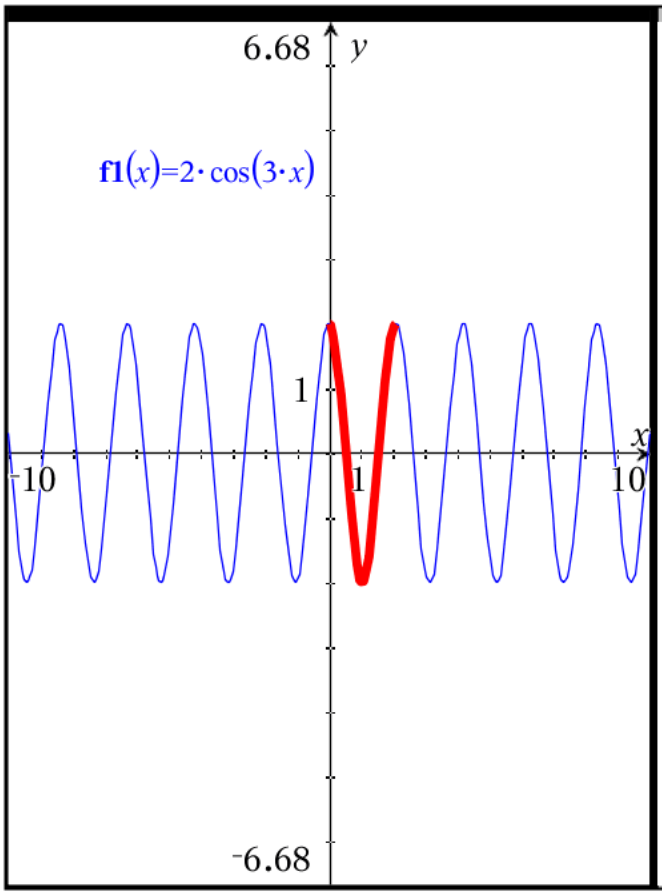
#2 page 485



To find the period of a function in the form

y =acos(bx+c)+d

Step 1: Period length = $\frac{2\cdot\pi}{b}$

Step 2: Period starts at $\frac{-c}{b}$

Period ends at $\frac{-c}{b}+\frac{2\cdot\pi}{b}$

In this problem, y =2cos(3x)

2 = amplitude (vertical stretch)

$\frac{2\cdot\pi}{3}$ = period length so period length is $\frac{2\pi}{3}$

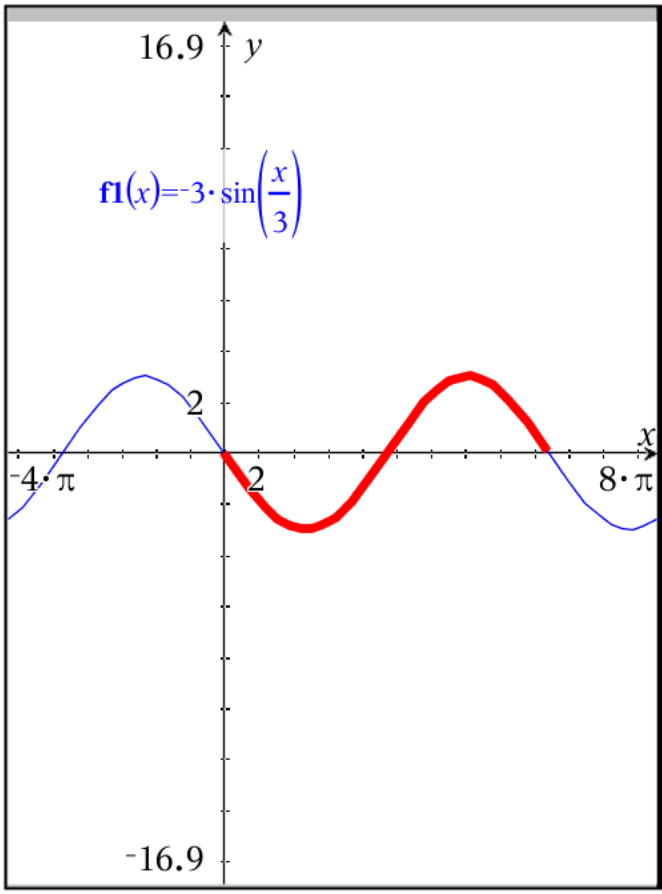
Since no constant inside of sine there is

NO PHASE SHIFT

Period $[0,\frac{2\pi}{3})$ or Period $0\le x<\frac{2\pi}{3}$

(this is a horizontal compression)

#4 page 485



To find the period of a function in the form

y =asin(bx+c)+d

Step 1: Period length = $\frac{2\cdot\pi}{b}$

Step 2: Period starts at $\frac{-c}{b}$

Period ends at $\frac{-c}{b}+\frac{2\cdot\pi}{b}$

In this problem, y =−3sin($\frac{1}{3}$ x)

3 = amplitude (reflection over y axis)

(vertical stretch)

$\frac{2\cdot\pi}{\frac{1}{3}}$ = period length so period length is 6π

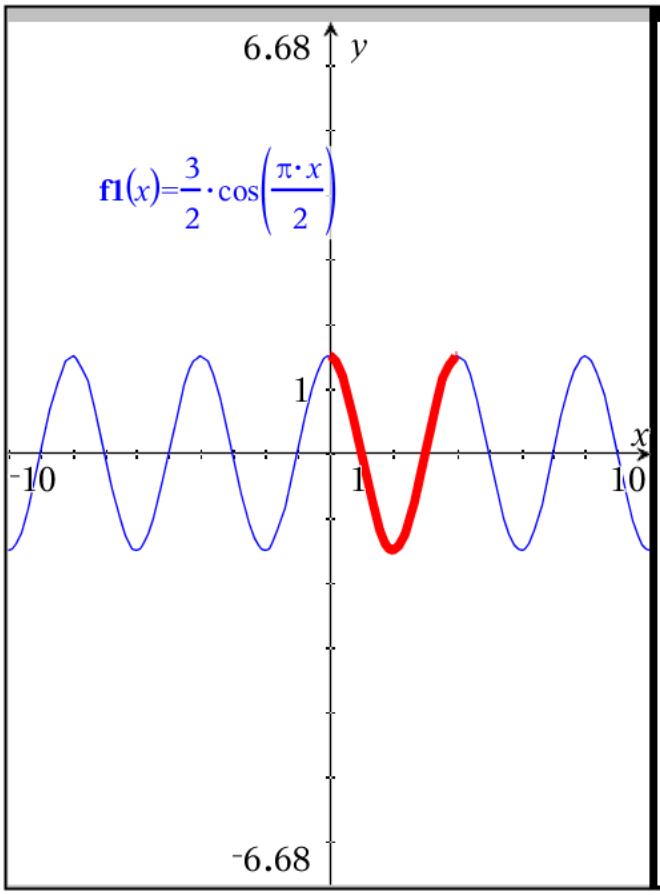
Since no constant inside of sine there is

NO PHASE SHIFT

Period $[0,6\pi)$ or Period $0\le x<6\pi$

(this is a horizontal stretch)

#6 page 485



To find the period of a function in the form

y =acos(bx+c)+d

Step 1: Period length $=\frac{2\cdot\pi}{b}$

Step 2: Period starts at $\frac{-c}{b}$

Period ends at $\frac{-c}{b}+\frac{2\cdot\pi}{b}$

In this problem, $y=\frac{3}{2}\cdot\cos\left(\frac{\pi\cdot x}{2}\right)$

$\frac{3}{2}$ = amplitude (vertical stretch)

$\frac{2\cdot\pi}{\frac{\pi}{2}}$ = period length so period length is 4

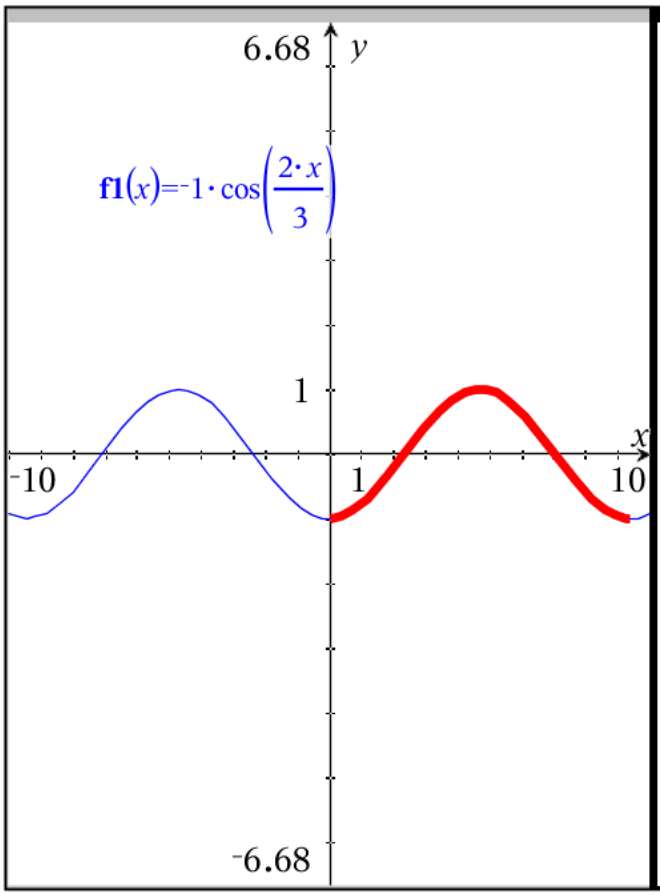
Since no constant inside of sine there is

NO PHASE SHIFT

Period $[0,4)$ or Period $0\le x<4$

(this is a horizontal compression)

#8 page 485



To find the period of a function in the form

y =acos(bx+c)+d

Step 1: Period length $=\frac{2\cdot\pi}{b}$

Step 2: Period starts at $\frac{-c}{b}$

Period ends at $\frac{-c}{b}+\frac{2\cdot\pi}{b}$

In this problem, $y=-1\cdot\cos\left(\frac{2\cdot x}{3}\right)$

1 = amplitude (vertical reflection)

$\frac{2\cdot\pi}{\frac{2}{3}}$ = period length so period length is $3\cdot\pi$

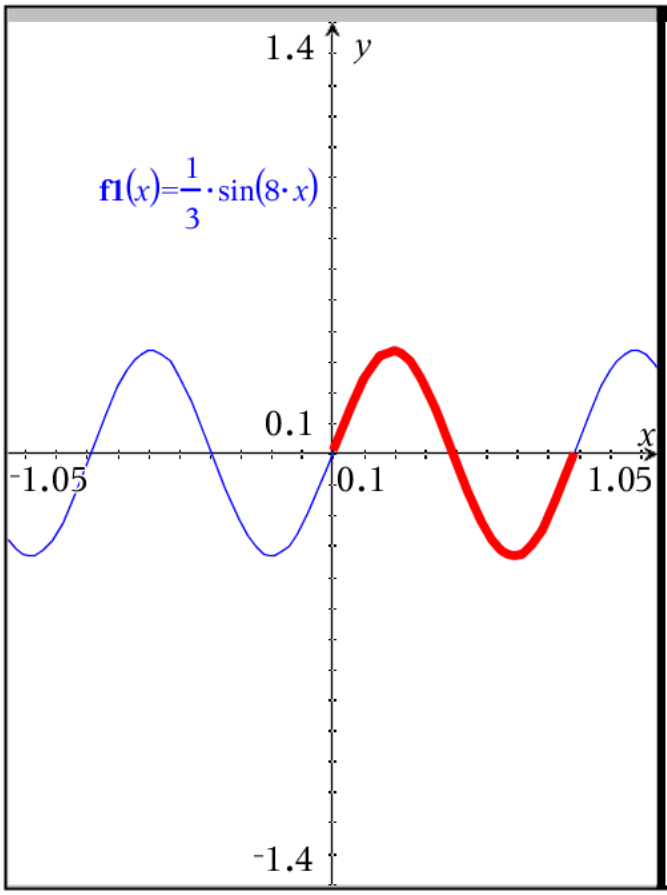
Since no constant inside of sine there is

NO PHASE SHIFT

Period $[0,3\cdot\pi)$ or Period $0\le x<3\cdot\pi$

(this is a horizontal stretch)

#10 page 485



To find the period of a function in the form

y =asin(bx+c)+d

Step 1: Period length $=\frac{2\cdot\pi}{b}$

Step 2: Period starts at $\frac{-c}{b}$

Period ends at $\frac{-c}{b}+\frac{2\cdot\pi}{b}$

In this problem, $y=\frac{1}{3}\sin(8x)$

$\frac{1}{3}$ = amplitude (vertical compression)

$\frac{2\cdot\pi}{8}$ = period length so period length is $\frac{\pi}{4}$

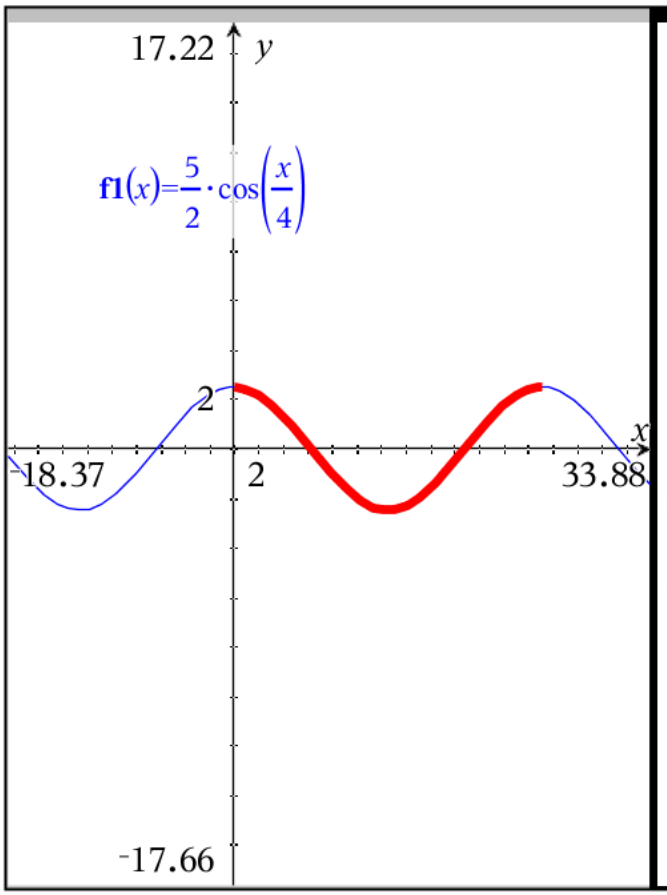
Since no constant inside of sine there is

NO PHASE SHIFT

Period $[0,\frac{\pi}{5})$ or Period $0\le x<\frac{\pi}{4}$

(this is a horizontal compression)

#12 page 485



To find the period of a function in the form

y =acos(bx+c)+d

Step 1: Period length $=\frac{2\cdot\pi}{b}$

Step 2: Period starts at $\frac{-c}{b}$

Period ends at $\frac{-c}{b}+\frac{2\cdot\pi}{b}$

In this problem, $y=\frac{5}{2}\cdot\cos\left(\frac{1}{4}x\right)$

$\frac{5}{2}$ = amplitude (vertical stretch)

$\frac{2\cdot\pi}{\frac{1}{4}}$ = period length so period length is $8\cdot\pi$

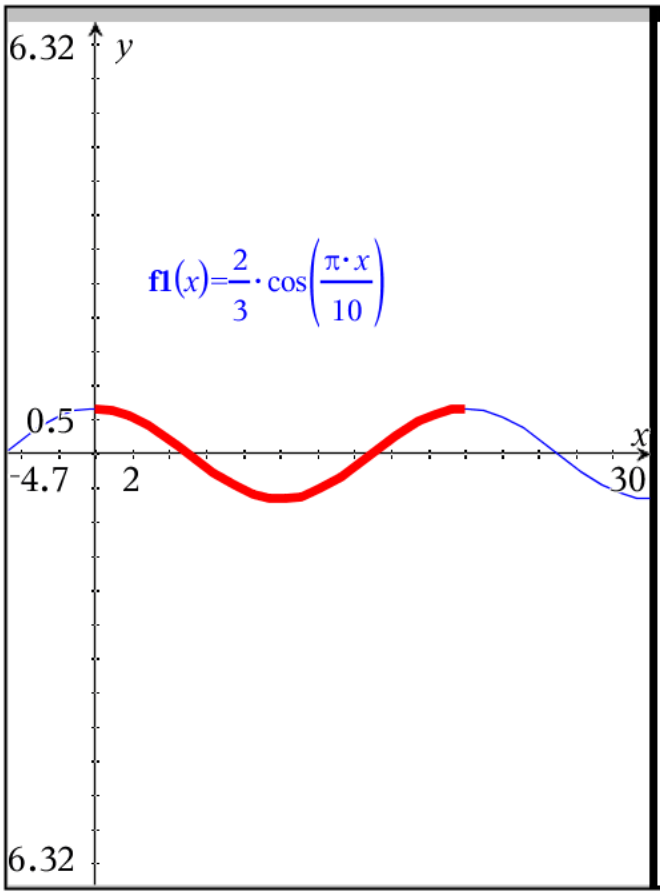
Since no constant inside of sine there is

NO PHASE SHIFT

Period $[0,8\cdot\pi)$ or Period $0\le x<8\cdot\pi$

(this is a horizontal stretch)

#14 page 485



To find the period of a function in the form

y =acos(bx+c)+d

Step 1: Period length $=\frac{2\cdot\pi}{b}$

Step 2: Period starts at $\frac{-c}{b}$

Period ends at $\frac{-c}{b}+\frac{2\cdot\pi}{b}$

In this problem, $y=\frac{2}{3}\cdot\cos\left(\frac{\pi}{10}\cdot x\right)$

$\frac{2}{3}$ = amplitude (vertical compression)

$\frac{2\cdot\pi}{\frac{\pi}{10}}$ = period length so period length is 20

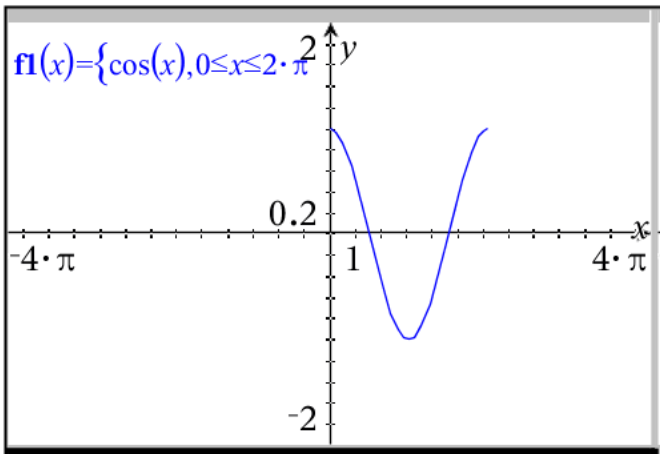
Since no constant inside of sine there is

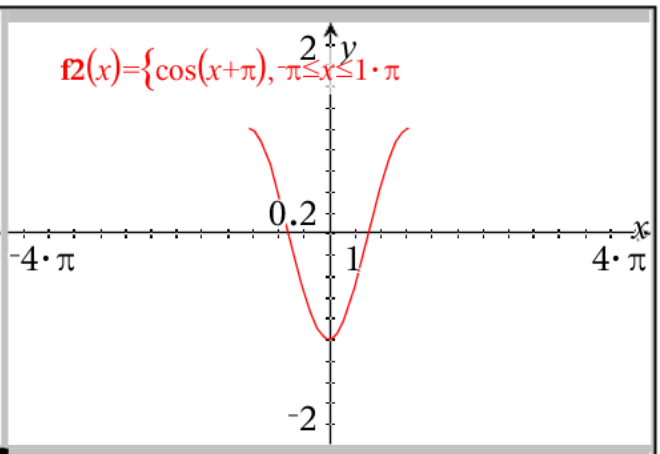
NO PHASE SHIFT

Period [0,20) or Period $0\le x<20$

(this is a horizontal stretch)

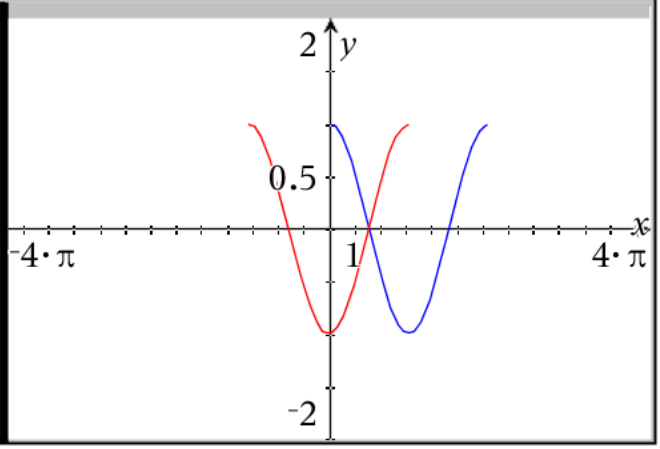
#16 page 485



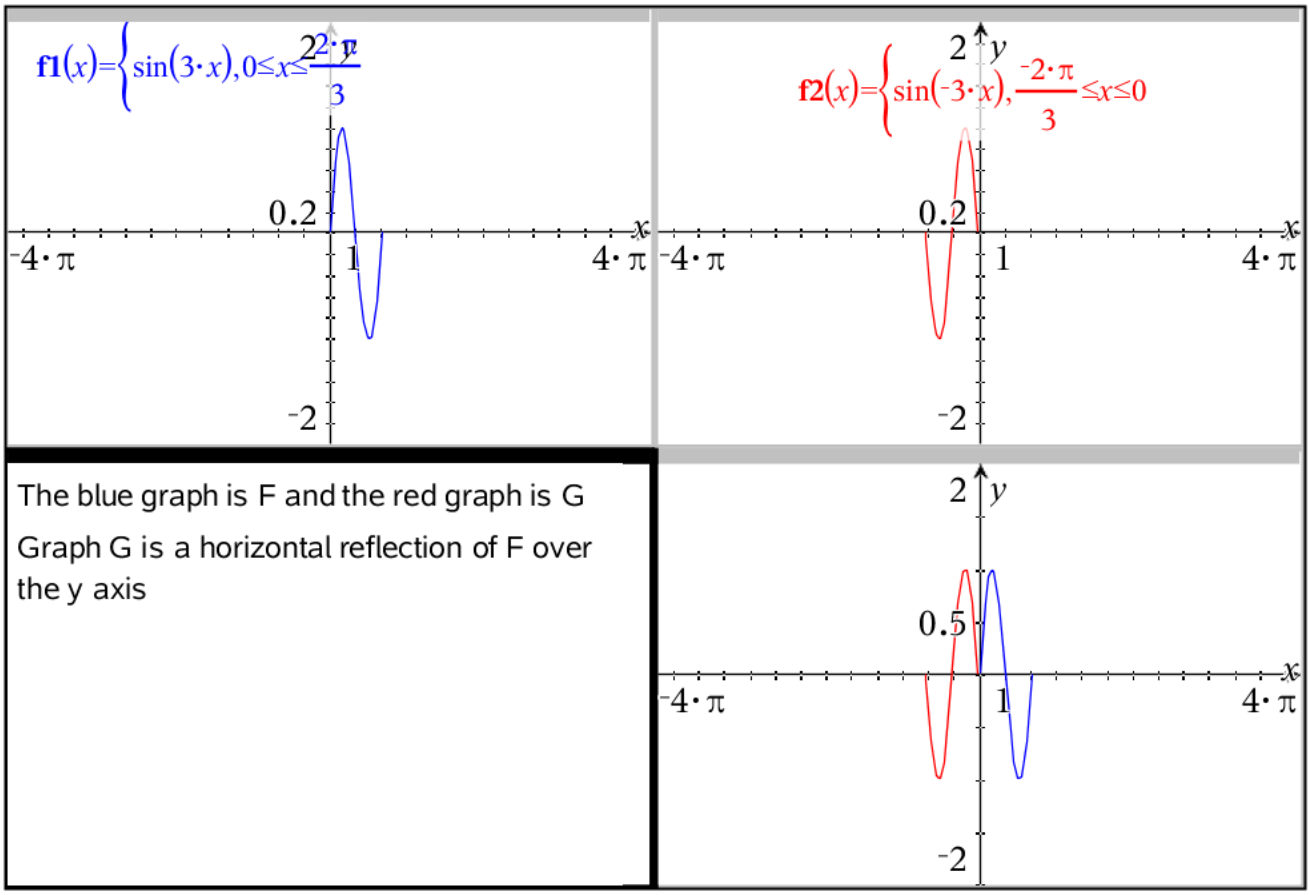


The blue graph is F and the red graph is G

Graph G is a horizontal shift to the LEFT π



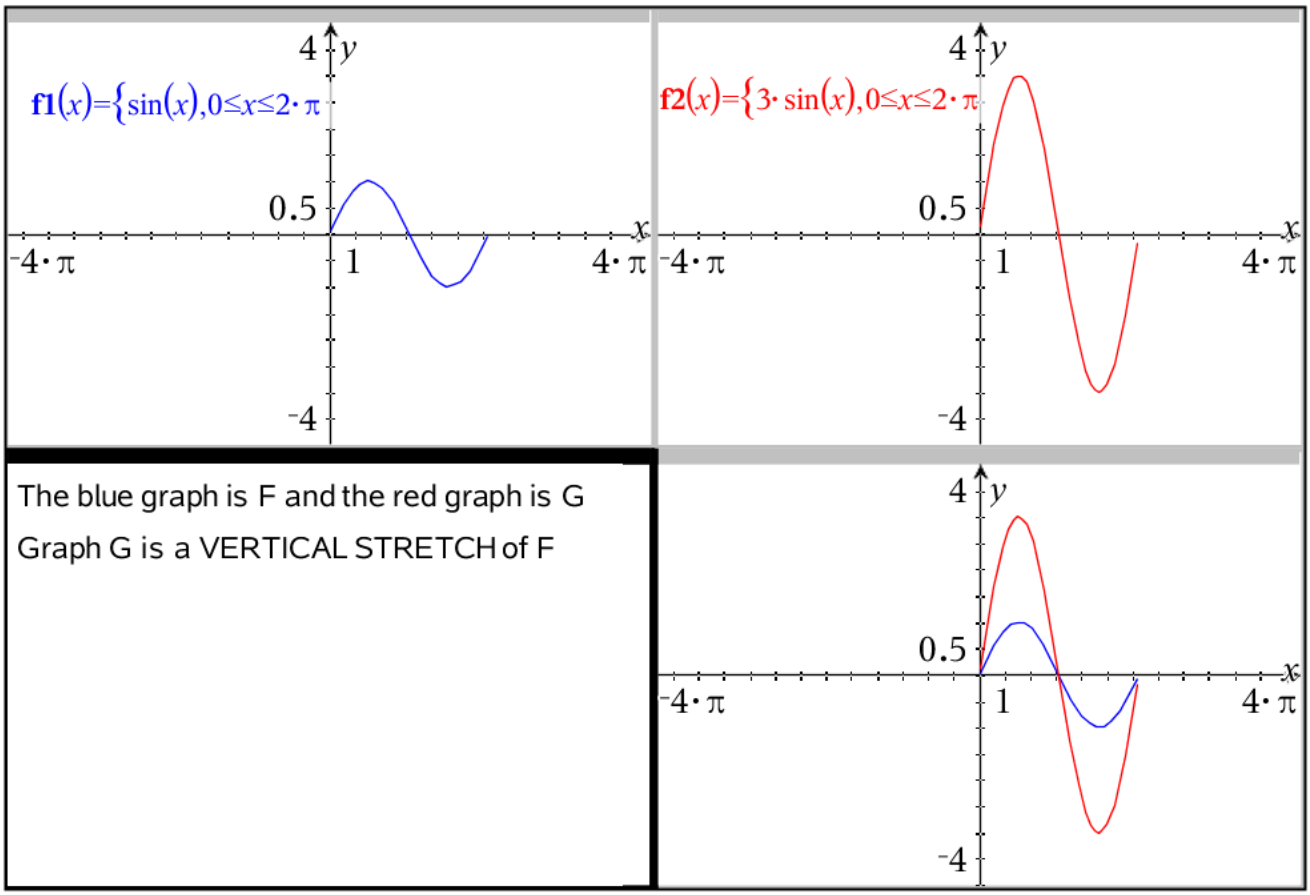
#18 page 485



The blue graph is F and the red graph is G

Graph G is a horizontal reflection of F over the y axis

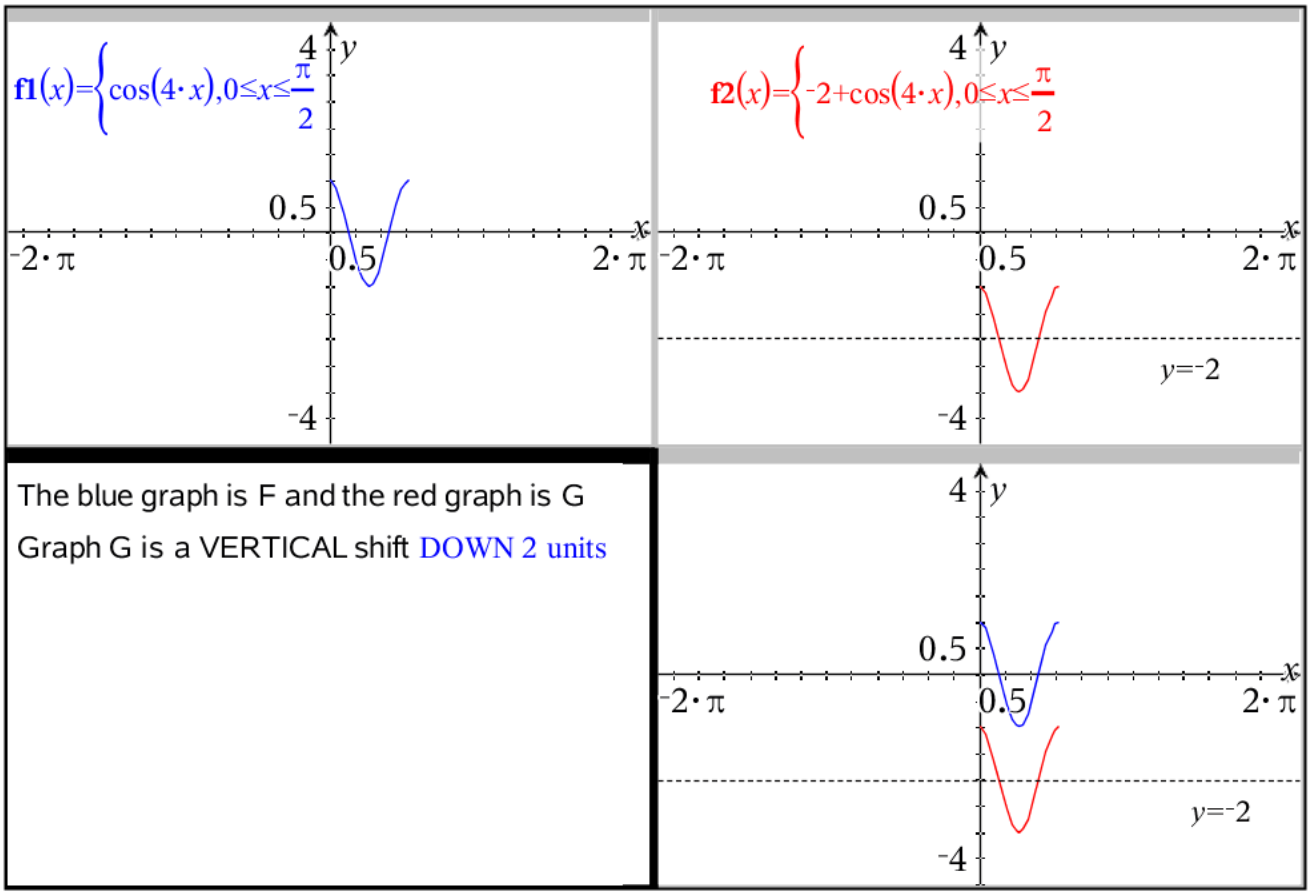
#20 page 485



The blue graph is F and the red graph is G

Graph G is a VERTICAL STRETCH of F

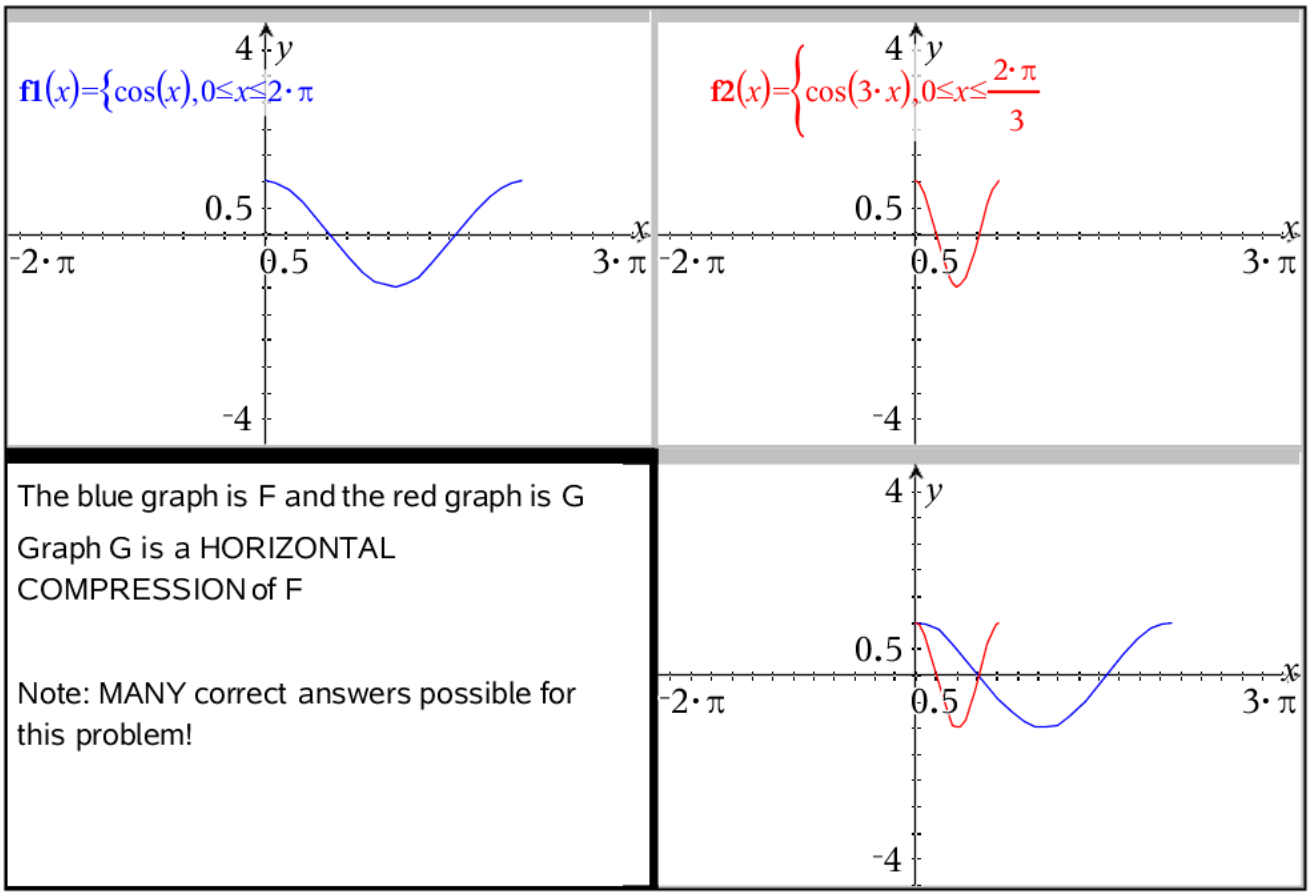
#22 page 485



The blue graph is F and the red graph is G

Graph G is a VERTICAL shift DOWN 2 units

#24 page 485

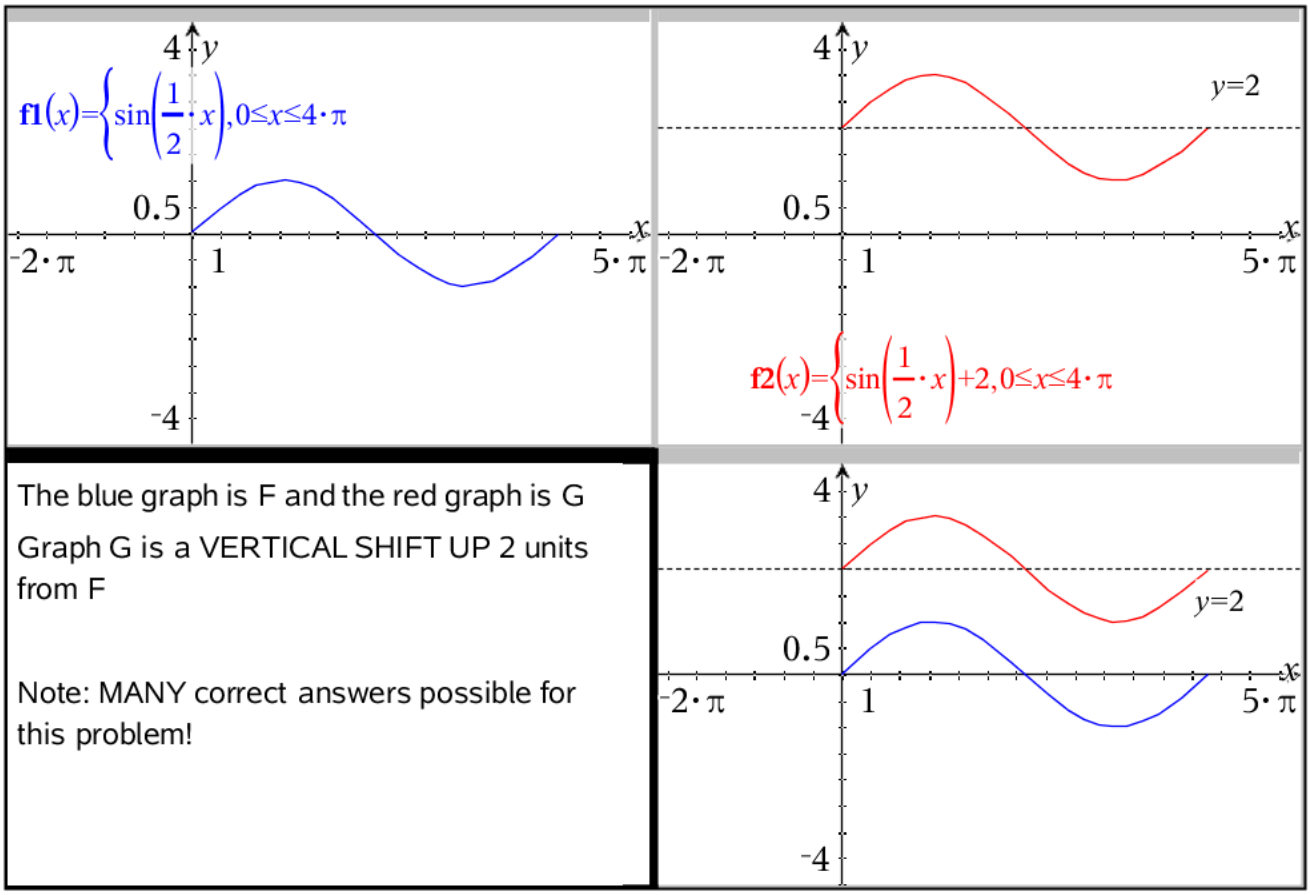


The blue graph is F and the red graph is G

Graph G is a HORIZONTAL COMPRESSION of F

Note: MANY correct answers possible for this problem!

#26 page 485

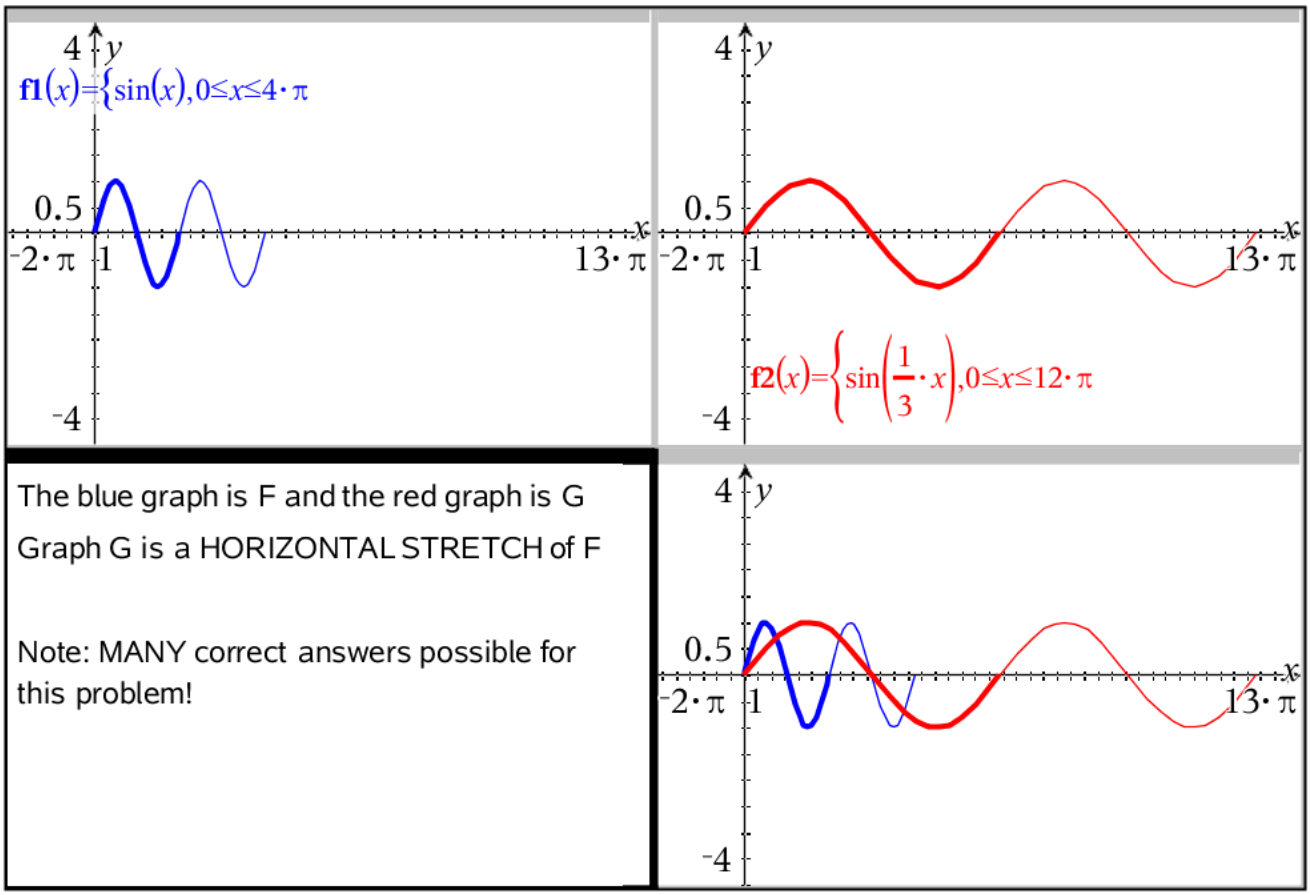


The blue graph is F and the red graph is G

Graph G is a VERTICAL SHIFT UP 2 units from F

Note: MANY correct answers possible for this problem!

#28 page 485

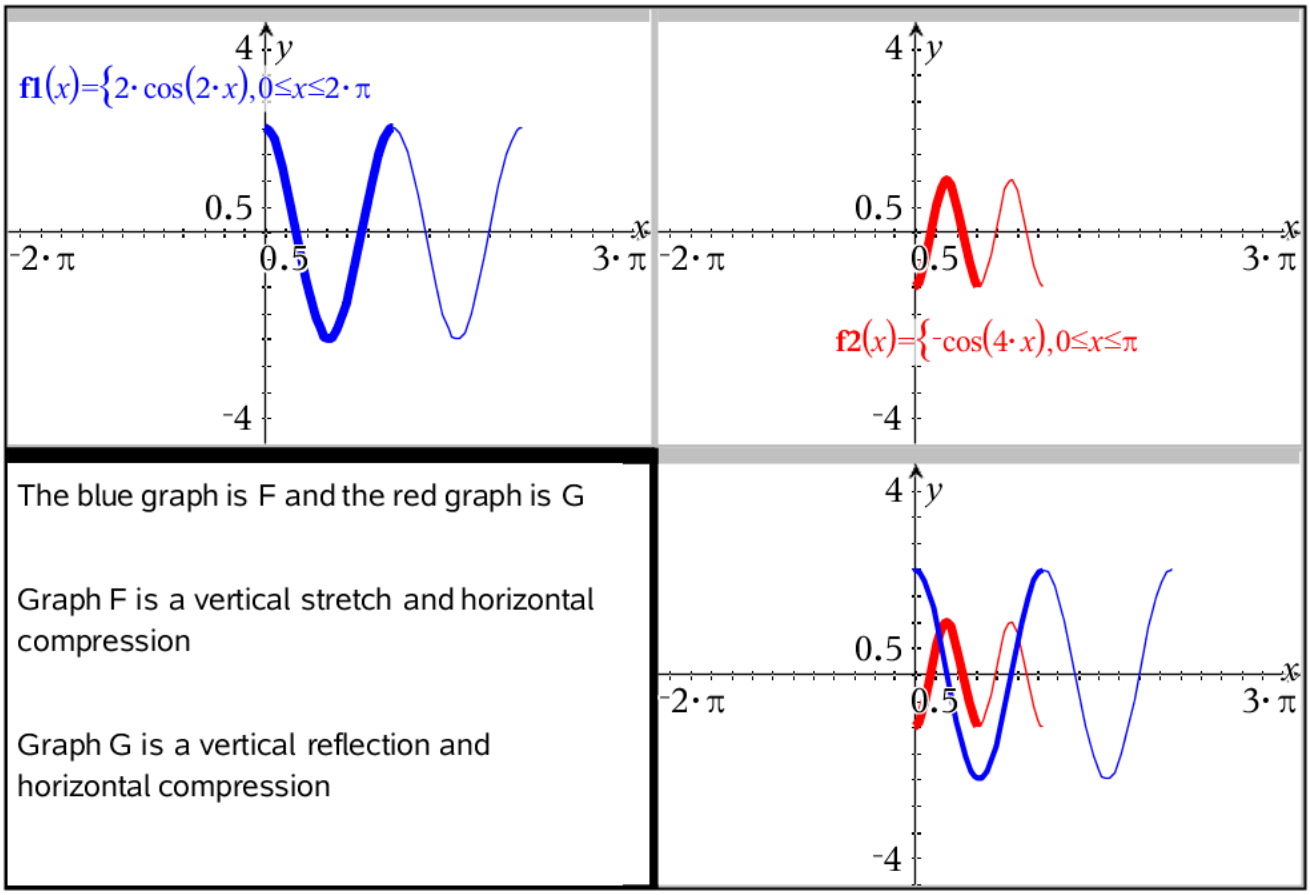


The blue graph is F and the red graph is G

Graph G is a HORIZONTAL STRETCH of F

Note: MANY correct answers possible for this problem!

#30 page 485

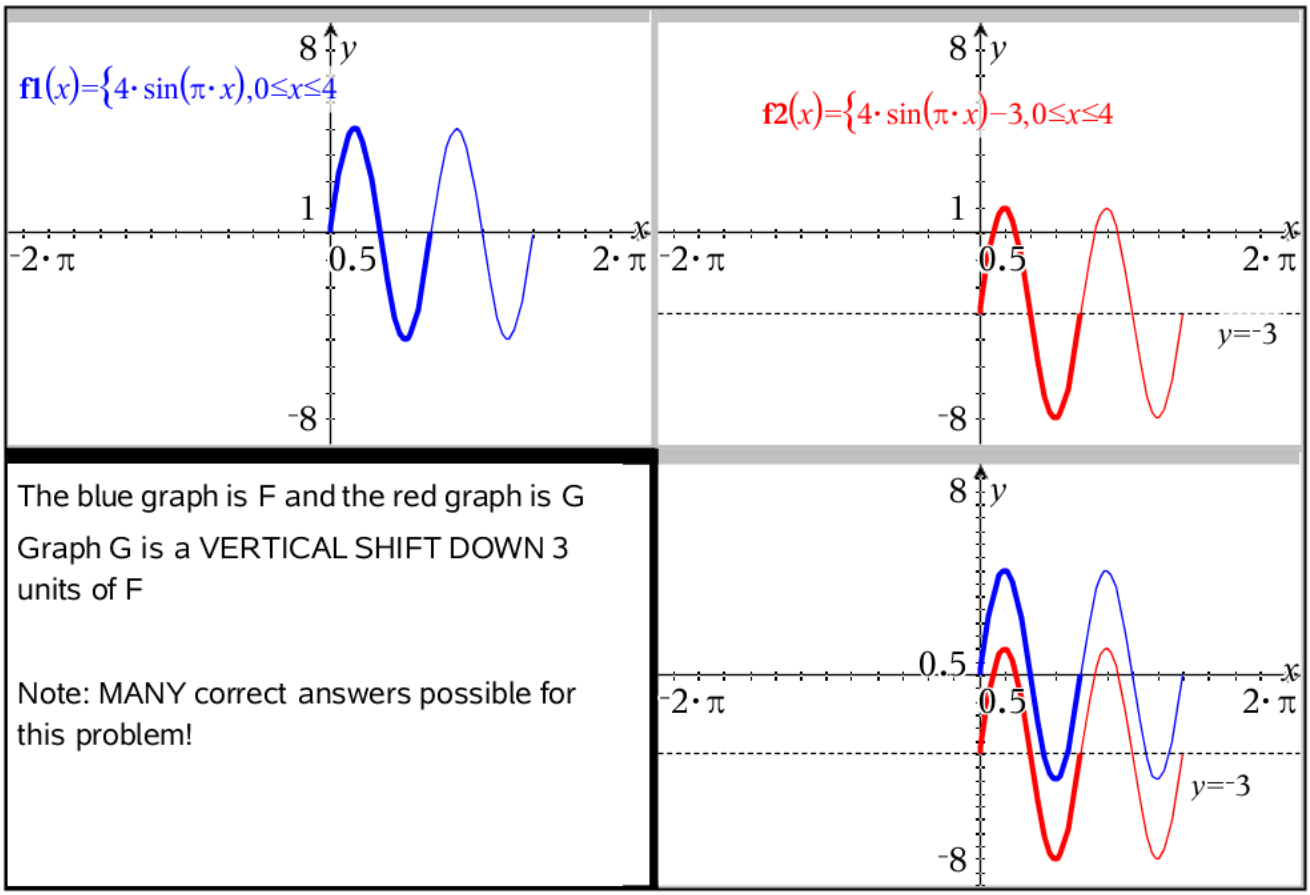


The blue graph is F and the red graph is G

Graph F is a vertical stretch and horizontal compression

Graph G is a vertical reflection and horizontal compression

#32 page 485

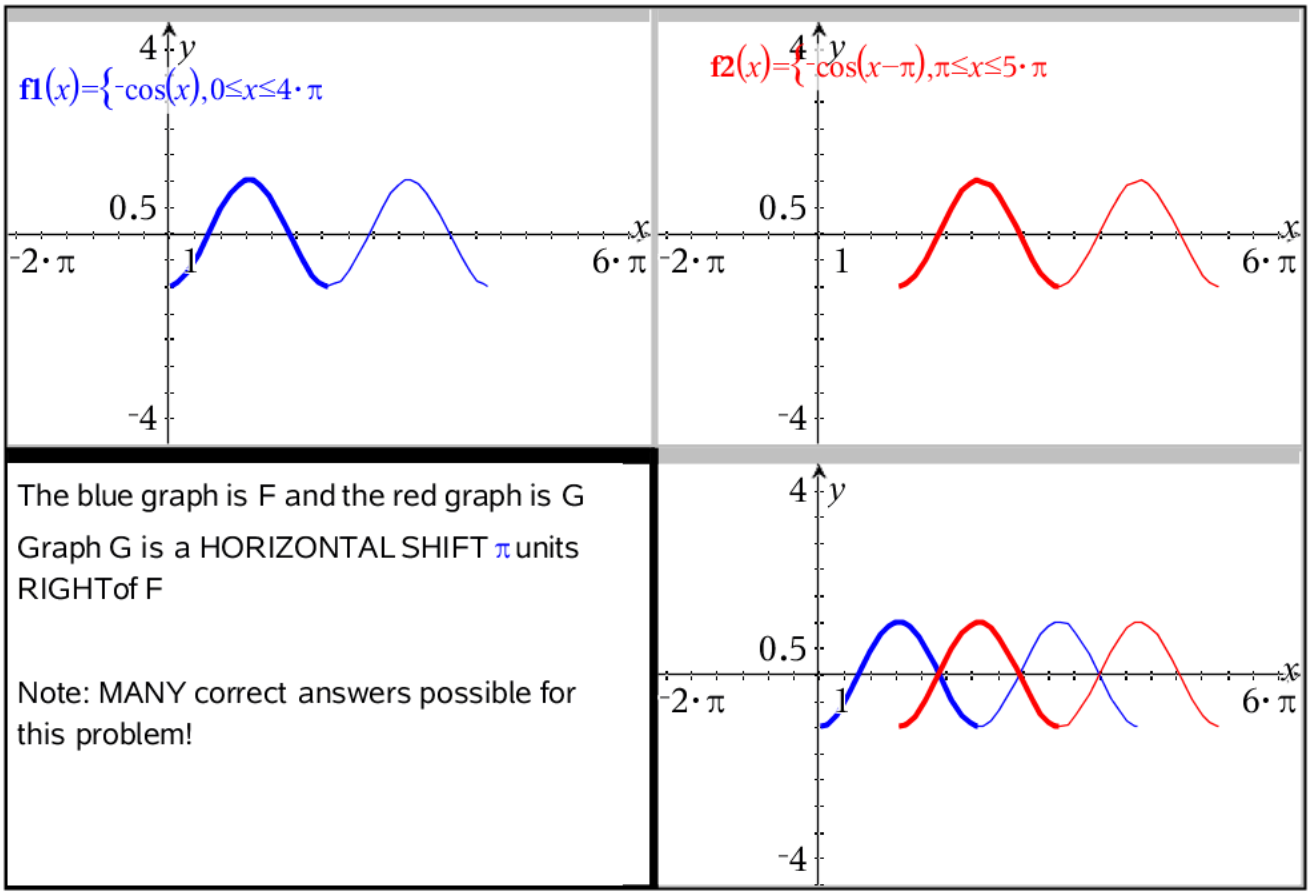


The blue graph is F and the red graph is G

Graph G is a VERTICAL SHIFT DOWN 3 units of F

Note: MANY correct answers possible for this problem!

#34 page 485

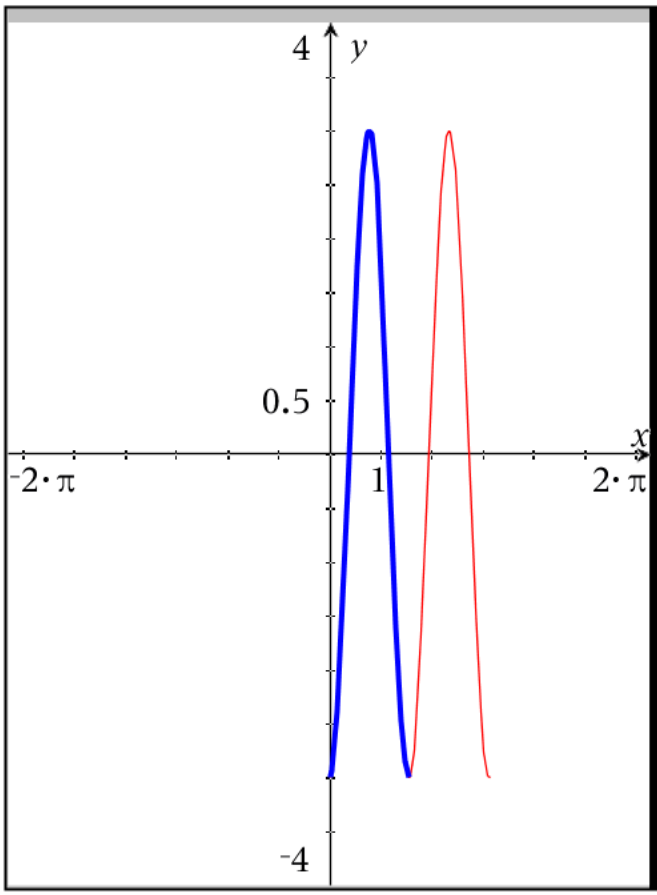


The blue graph is F and the red graph is G

Graph G is a HORIZONTAL SHIFT π units RIGHTof F

Note: MANY correct answers possible for this problem!

#36 page 485



$y=-3\cos(4x)$

ONE PERIOD = $[0,\frac{\pi}{2})$

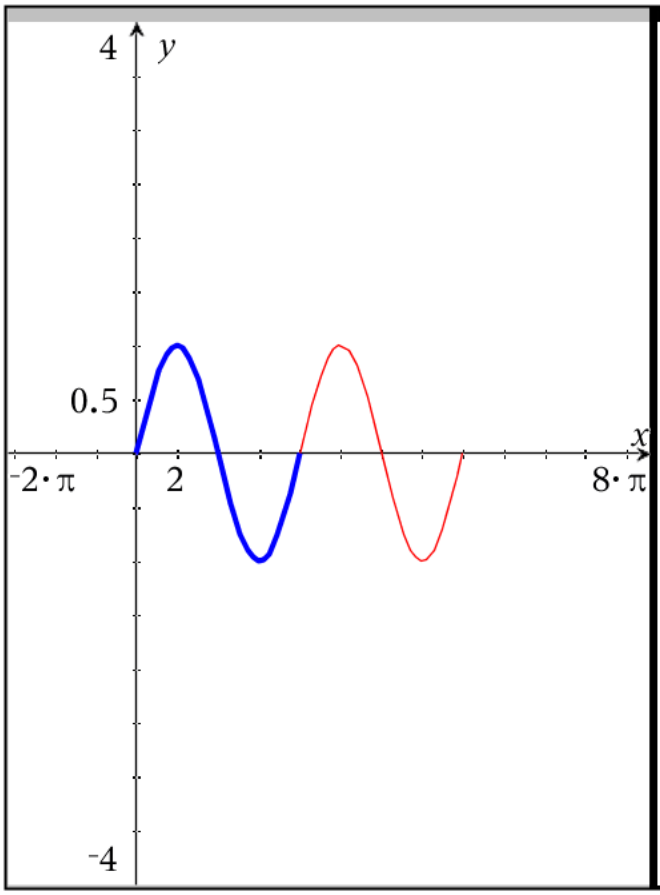
Range $[-3,3]$

This graph is a VERTICAL STRETCH

This graph is a HORIZONTAL COMPRESSION

This graph is a VERTICAL REFLECTION over x axis (line y = 0)

#38 page 486



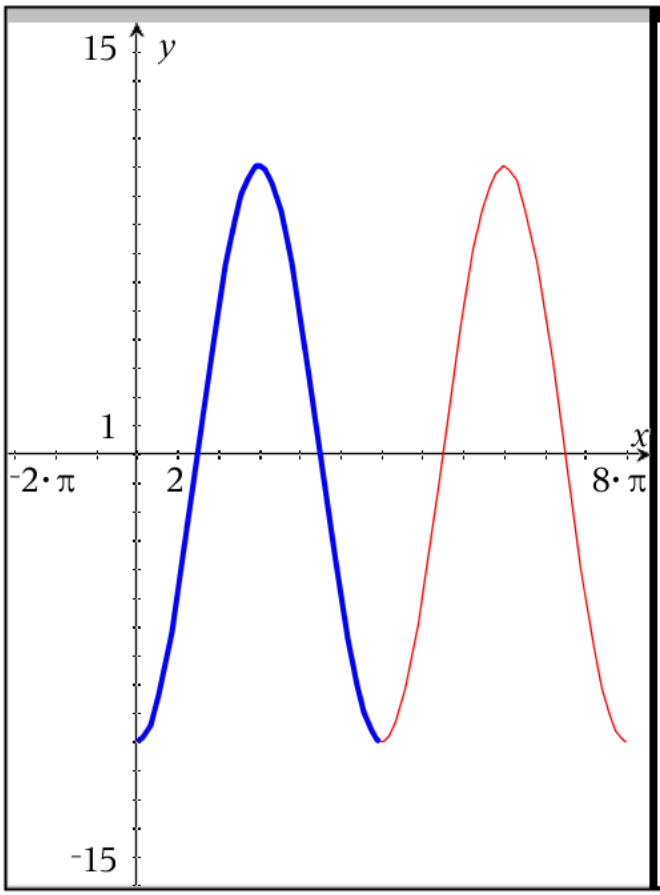
$y=\sin\left(\frac{\pi \cdot x}{4}\right)$

ONE PERIOD = [0,8)

Range [−1,1]

This graph is a HORIZONTAL STRETCH

#40 page 486



$y=-10\cdot\cos\left(\frac{\pi \cdot x}{6}\right)$

ONE PERIOD = [0,12)

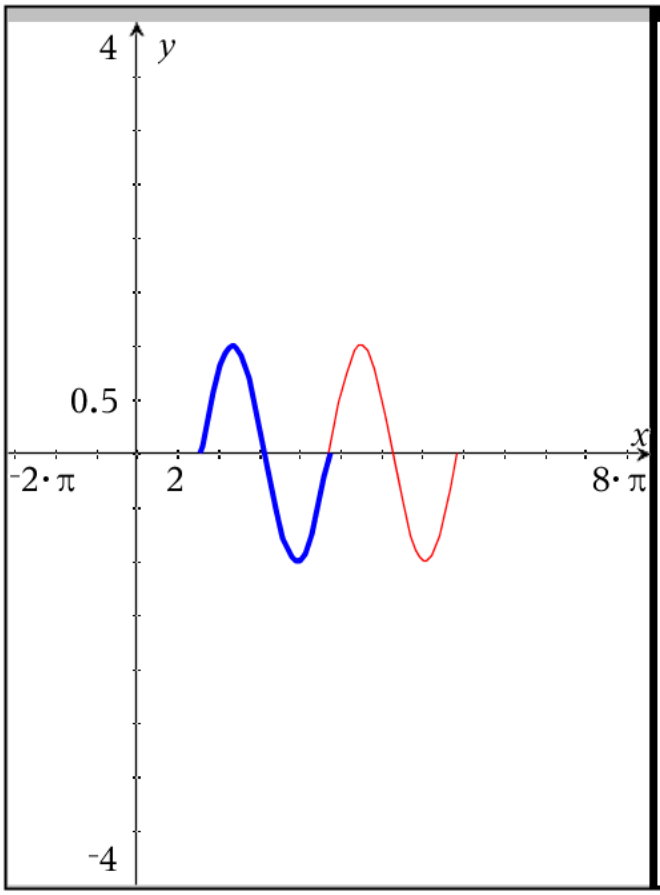
Range [−10,10]

This graph is a VERTICAL STRETCH

This graph is a HORIZONTAL STRETCH

This graph is a VERTICAL REFLECTION over x axis (line y = 0)

#42 page 486



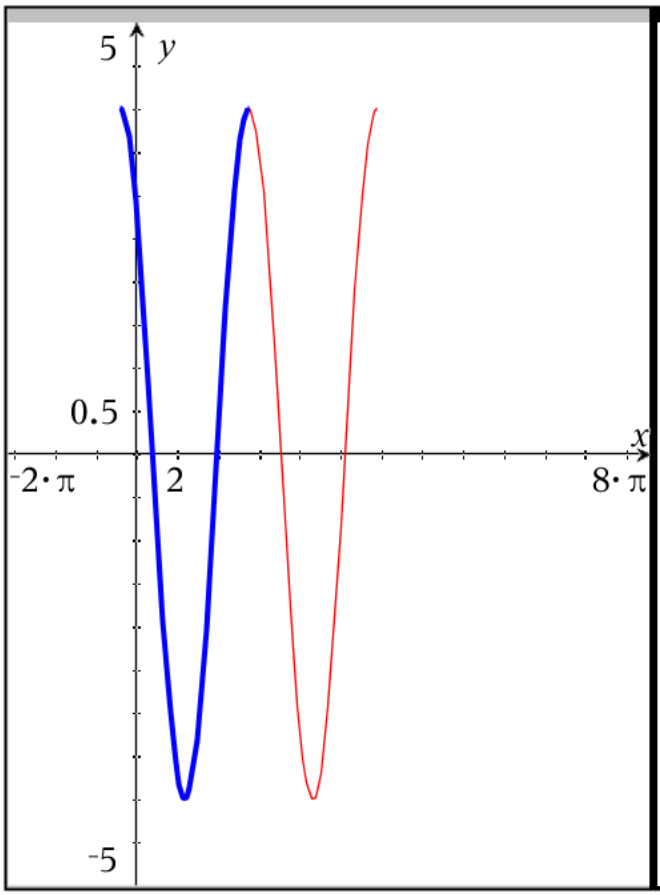
$y=\sin(x-\pi)$

ONE PERIOD = $[\pi, 3\cdot\pi)$

Range $[-1,1]$

This graph is a HORIZONTAL SHIFT RIGHT π units

#44 page 486



$y=4\cos\left(x+\frac{\pi}{4}\right)$

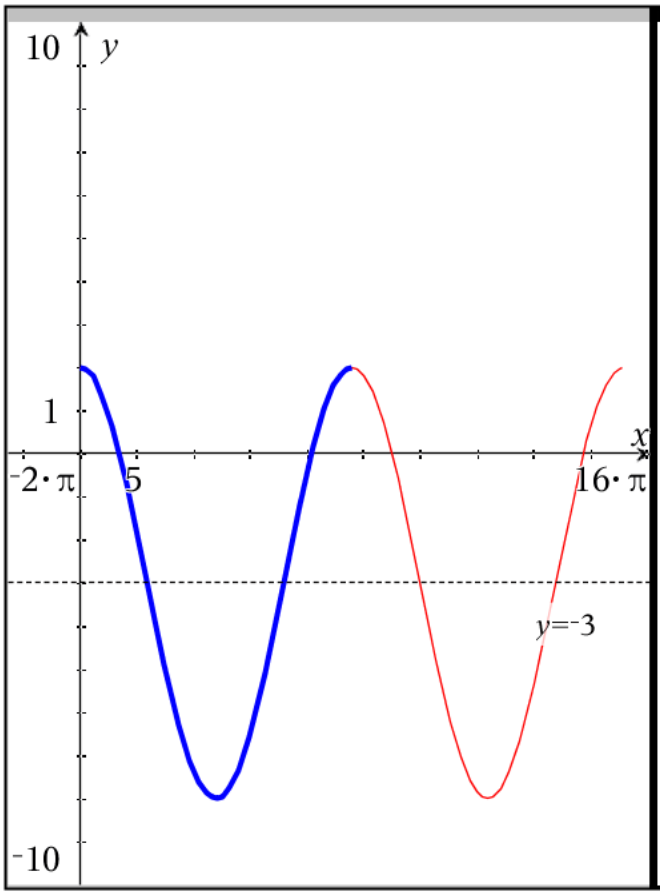
ONE PERIOD = $[\frac{\pi}{4}, \frac{7\cdot\pi}{4})$

Range $[-4,4]$

This graph is a HORIZONTAL SHIFT LEFT $\frac{\pi}{4}$ units

This graph is a VERTICAL STRETCH

#46 page 486



$y=-3+5\cos\left(\frac{\pi t}{12}\right)$

ONE PERIOD = $[0, 24)$

Range $[-8, 2]$

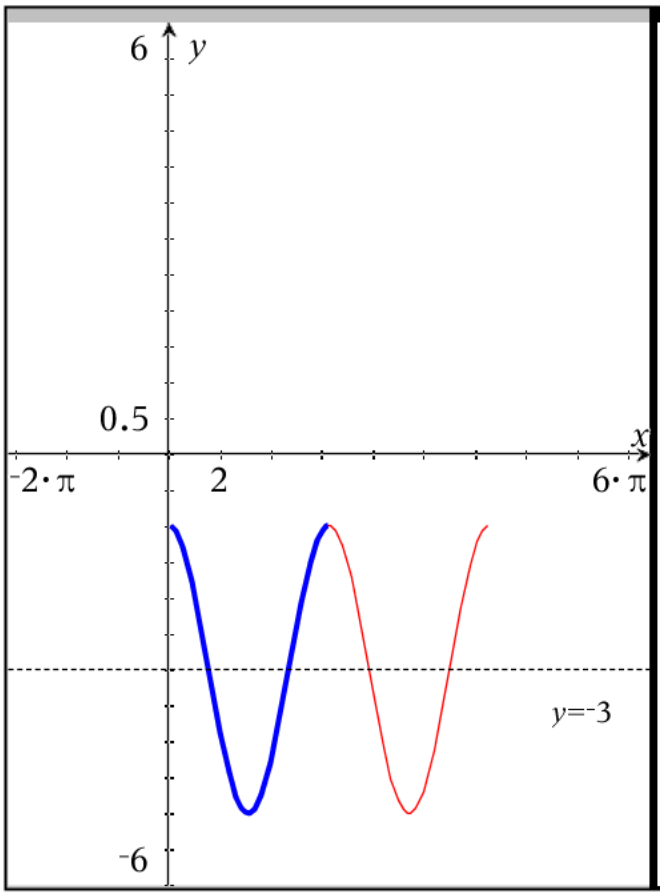
This graph is a HORIZONTAL STRETCH

This graph is a VERTICAL STRETCH

This graph is a VERTICAL SHIFT DOWN 3 units

This graph has a midline of y =−3

#48 page 486



$y=2\cos(x)-3$

ONE PERIOD = $[0, 2\cdot\pi)$

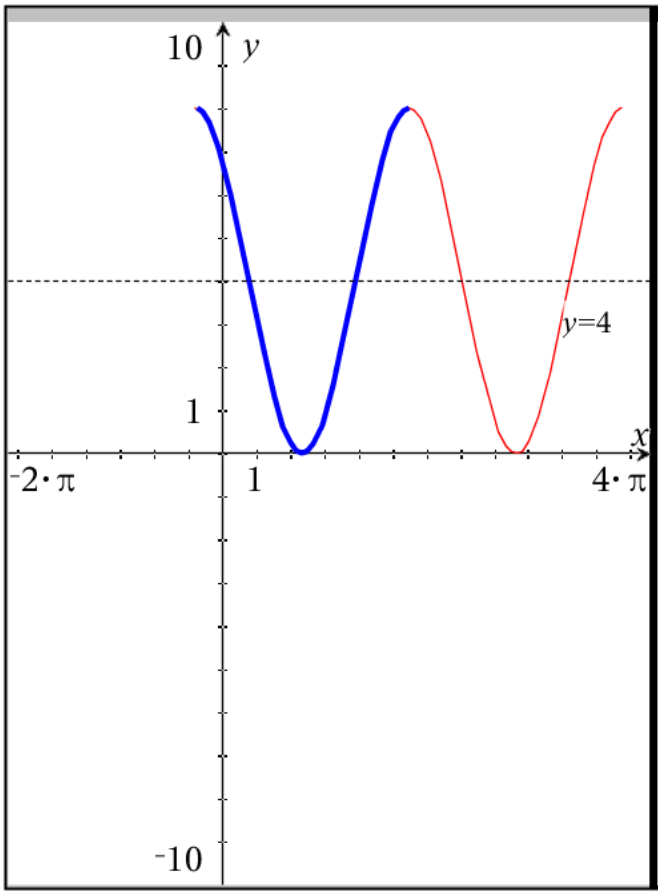
Range $[-5, -2]$

This graph is a VERTICAL STRETCH

This graph is a VERTICAL SHIFT DOWN 3 units

This graph has a midline of y =−3

#50 page 486



$y=4\cdot\cos\left(x+\frac{\pi}{4}\right)+4$

ONE PERIOD = $[\frac{-\pi}{4},\frac{7\cdot\pi}{4})$

Range [0,8]

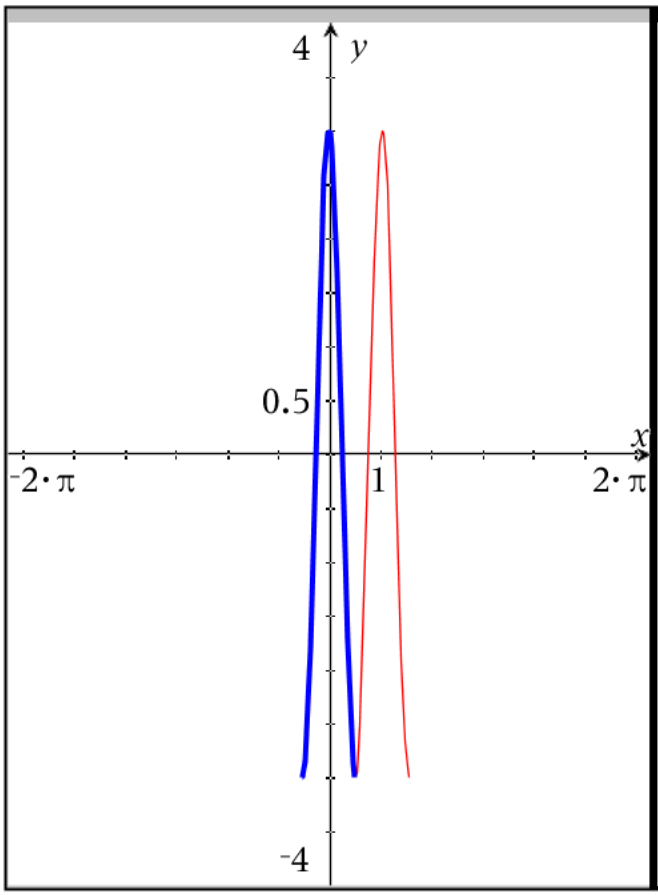
This graph is a HORIZONTAL SHIFT $\frac{\pi}{4}$ LEFT

This graph is a VERTICAL STRETCH

This graph is a VERTICAL SHIFT UP 4 units

This graph has a midline of y =4

#52 page 486



$y=-3\cdot\cos(6x+\pi)=-3\cdot\cos\left(6\cdot\left(x+\frac{\pi}{6}\right)\right)$

ONE PERIOD = $[\frac{-\pi}{6},\frac{\pi}{6})$

Range [−3,3]

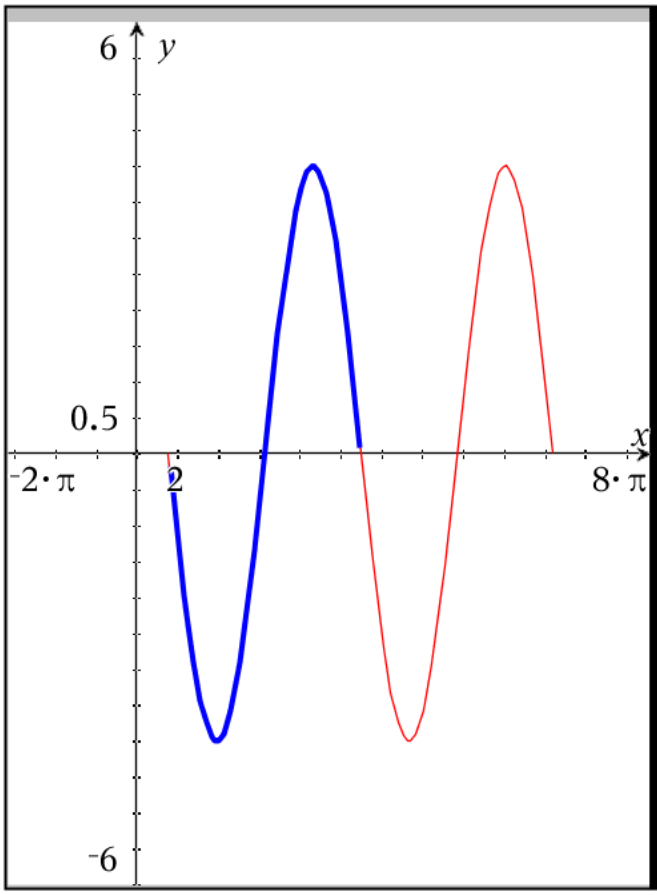
This graph is a HORIZONTAL SHIFT $\frac{\pi}{6}$ LEFT

This graph is a HORIZONTAL COMPRESSION

This graph is a VERTICAL STRETCH

This graph is VERTICAL REFLECTION over x axis (y=0)

#54 page 486



$y=-4\cdot\sin\left(\frac{2}{3}x-\frac{\pi}{3}\right)=-4\cdot\sin\left(\frac{2}{3}\cdot\left(x-\frac{\pi}{2}\right)\right)$

ONE PERIOD = $[\frac{\pi}{2},\frac{7\pi}{2})$

Range [−4,4]

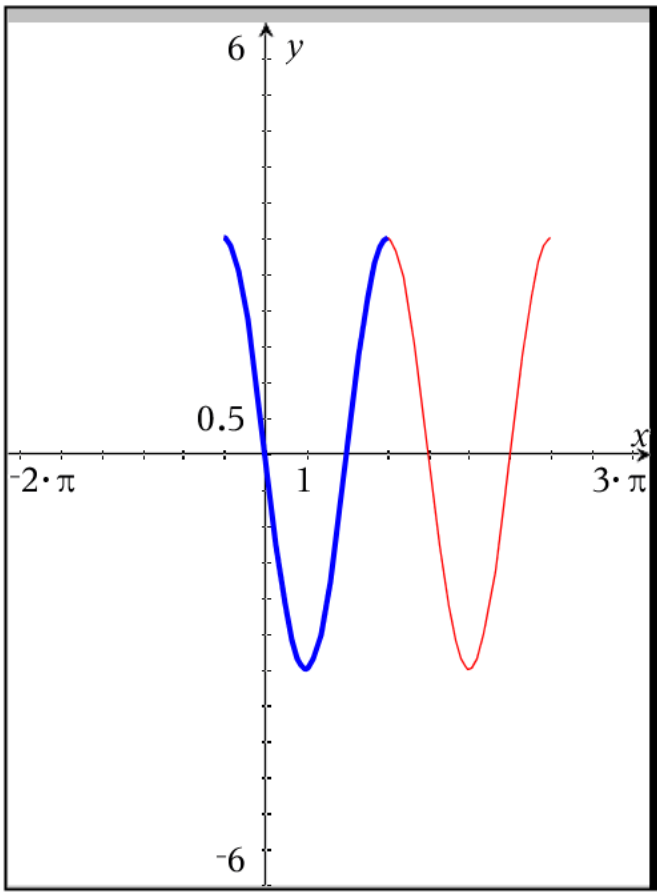
This graph is a HORIZONTAL SHIFT $\frac{\pi}{2}$ RIGHT

This graph is a HORIZONTAL STRETCH

This graph is a VERTICAL STRETCH

This graph is VERTICAL REFLECTION over x axis (y=0)

#56 page 486



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

ONE PERIOD = $[-1,5)$

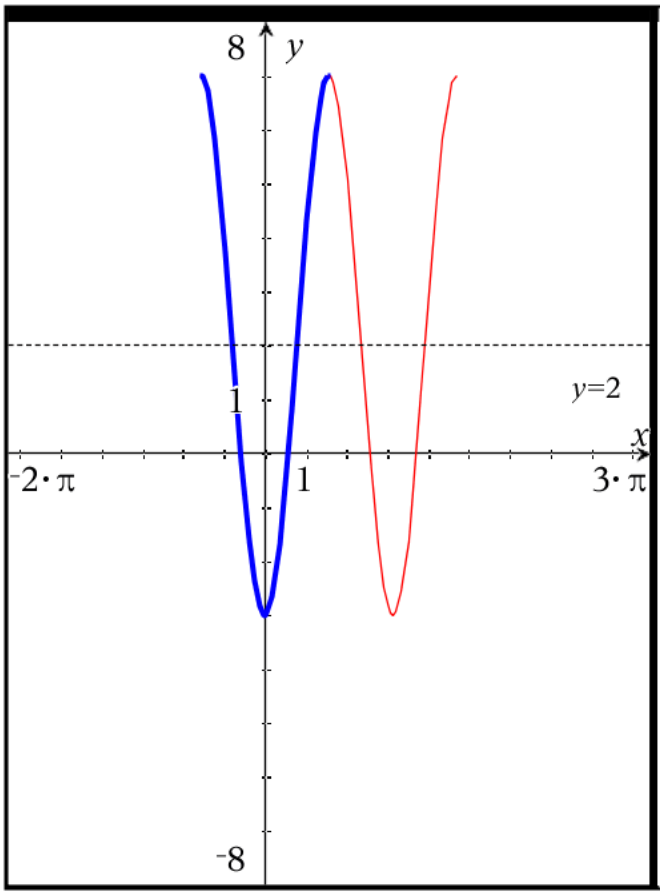
Range [−3,3]

This graph is a HORIZONTAL SHIFT 1 LEFT

This graph is a HORIZONTAL COMPRESSION

This graph is a VERTICAL STRETCH

#58 page 486



$y=5\cdot\cos(\pi-2x)+2=5\cdot\cos\left(-2\cdot\left(x-\frac{\pi}{2}\right)\right)+2$

ONE PERIOD = $[\frac{-\pi}{2},\frac{\pi}{2})$

Range [−3,7]

This graph is a HORIZONTAL SHIFT $\frac{\pi}{2}$ RIGHT

This graph is a HORIZONTAL COMPRESSION

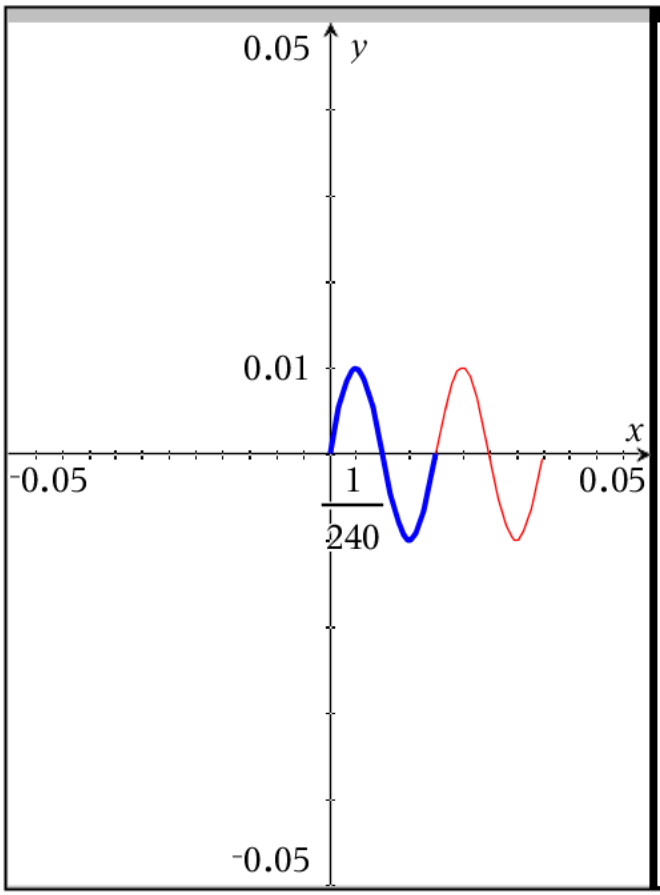
This graph is a VERTICAL STRETCH

This graph is a VERTICAL SHIFT UP 2

This graph has a midline of y = 2

This graph is a HORIZONTAL REFLECTION about y axis (x=0)

#60 page 486



$y=\frac{1}{100}\cdot\sin(120\pi t)$

ONE PERIOD = $[0,\frac{1}{60})$

Range $[\frac{-1}{100},\frac{1}{100}]$

This graph is a HORIZONTAL COMPRESSION

This graph is a VERTICAL COMPRESSION