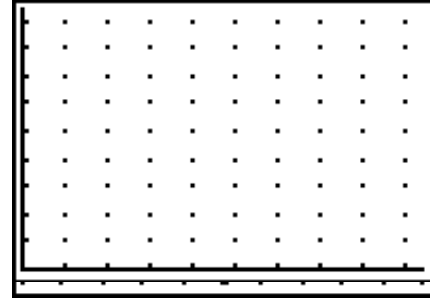


2. Let's try another function: Graph $g(x)=2x-2$ in the same window. Record a sketch of this equation in the figure at the right.

Graph the inverse function $g^{-1}(x)$ the same way you did in exercise 1.

What is the equation of the inverse function?



_____ Enter this equation in y2. Confirm that you have written the correct equation using the graphs.

Locate two corresponding points on the graph of g : $(2, g(2))$ or $(2, 2)$ and $(3, g(3))$ or $(6, 4)$. Mark these on the sketch. Locate the two corresponding points on the graph of g^{-1} .

What is the derivative of $g(x)$? _____

What is the derivative of $g^{-1}(x)$? _____

What is the slope at each of the functions at the selected points?

Points on $g(x)$	Slope on $g(x)$	Points on $g^{-1}(x)$	Slope on $g^{-1}(x)$

3. Try another example: $h(x) = x^3$. Graph this equation on your calculator using a Zoom 6 window, set Xscl and Yscl=2. Sketch at the right. In addition add its inverse to the window.

Record the equation for $h^{-1}(x) =$ _____ Enter this equation in y2 and confirm your equation is correct.

Find the derivative of $h(x) =$ _____

Find the derivative of $h^{-1}(x) =$ _____

Find the slope at $(2, h(2))$ or $(2, 8)$ and $(-1, g(-1))$ or $(-1, -1)$ and the corresponding points on $h^{-1}(x)$. Record them in the chart below.

Points on $h(x)$	Slope on $h(x)$	Points on $h^{-1}(x)$	Slope on $h^{-1}(x)$

4. Make a record of what you have found so far:

Function	f	g	h
slope at point on original function			
slope at corresponding point on inverse function			

5. What do you notice about the relationship between the two slopes?

6. Let's try this with the function $I(x) = \sin(x)$.

Write the inverse function of $I(x)$ or $I^{-1}(x)$ _____

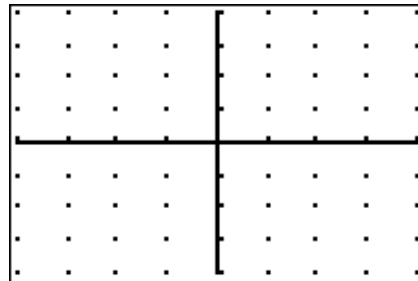
Graph each of these function in the window: $\left[-\frac{\pi}{2}, \frac{\pi}{2}, \frac{\pi}{8}, -\frac{\pi}{2}, \frac{\pi}{2}, \frac{\pi}{8}, 1\right]$

Record the graphs at the right.

Locate three points on the graph of

$$I(x): \left(\frac{\pi}{6}, I\left(\frac{\pi}{6}\right)\right) \text{ or } \left(\frac{\pi}{6}, \frac{1}{2}\right), \left(\frac{\pi}{3}, I\left(\frac{\pi}{3}\right)\right) \text{ or}$$

$$\left(\frac{\pi}{3}, \frac{\sqrt{3}}{2}\right) \text{ and } \left(\frac{\pi}{4}, I\left(\frac{\pi}{4}\right)\right) \text{ or } \left(\frac{\pi}{4}, \frac{\sqrt{2}}{2}\right)$$



Locate the three corresponding points on the inverse function $I^{-1}(x)$ and label them.

Find the slope at two functions at the six points. Record their slopes in the chart.

Points on $I(x)$	Slope on $I(x)$	Points on $I^{-1}(x)$	Slope on $I^{-1}(x)$

7. In general, if f and f^{-1} are inverse functions and you know the derivative of f at a point $(a, f(a))$ describe the derivative of f^{-1} at $(f(a), a)$

$$(f^{-1})'(f(a)) = \underline{\hspace{2cm}} \quad \text{or} \quad f'(a) = \underline{\hspace{2cm}}$$