

EXPLORATIONS

EXERCISE SOLUTIONS

Chapter 1

- (a) $[0, 126, 0] \times [0, 62, 0]$. (b) $[0, 378, 0] \times [0, 310, 0]$.
- $y1$ gives the graphs of three horizontal shiftings of $y = x^2$ and $y2$ gives the graphs of three vertical shiftings of $y = x^2$.
- The graph of $y2$ is the same as the graph of $y = -\sin(\pi x)$ on the interval $[-1, 1]$, as explained below. Since $\Delta x = 2/126$ here, $y1$ and $y2$ are plotted at points of the form

$$-1 + K(2/126), \text{ for } K = 0, 1, 2, 3, \dots, 126.$$

Consequently, the $y1$ values are $\sin(126\pi(-1 + (2/126)K))$ for $K = 0, 1, 2, \dots, 126$; but $126\pi(-1 + (2/126)K)$ is equal to $-126\pi + 2\pi K$ and $\sin(-126\pi + 2\pi K) = 0$, for $K = 0, 1, 2, \dots, 126$. For similar reasons, the plotted $y2$ values are $\sin(-125\pi + (250/126)\pi K)$, for $K = 0, 1, 2, \dots, 126$; but $\sin(-125\pi + (250/126)\pi K)$ is equal to $\sin(\pi + (250/126)\pi K) = -\sin((250/126)\pi K)$.

The following string of equalities can then be verified:

$$-\sin\left(\frac{250}{126}K\pi\right) = -\sin\left(-\frac{2K\pi}{126} + \frac{252}{126}K\pi\right) = -\sin\left(\frac{2K\pi}{126} - \pi\right) = -\sin\left(\pi\left(-1 + \frac{2}{126}K\right)\right).$$

- (a) $[0, 5000, 1000] \times [0, 10^8, 10^7]$.
 (b) $[0, 5000, 1000] \times [0, 9 \times 10^6, 9 \times 10^5]$.
 (c) $[0, 0.5, 0.1] \times [0, 0.05, 0.005]$.
- Enter $y1 = 800(1 + 0.055/12)^x$ in the $\langle y(x)= \rangle$ editor. Using **TblStart** = 0 and Δ **Tbl** = 12 produces the following table:

x	y1
0	800
12	845.1263
24	892.7981
36	943.1589
48	996.3605
60	1052.563

x=0
 TBLST SELCT x y

The investment first doubles in the thirteenth year.

- The Line style is best for $y1$, while the Dot style is best for $y2$ since the greatest integer function has a discontinuity at each integer.