

Extra Project 1.3b: Variations in the Graph of the Sine Function**Objective**

To illustrate the variations in the graph of the sine function.

Narrative

If you have not already done so, read Section 1.3 of the text.

In this project, we investigate the variations in the graph of the sine function.

Task

a) Type the command lines below into Maple in the order in which they are listed. They produce a graph of $f(x) = \sin x$.

```
> # Project 1.3b: Variations in the Graph of the Sine Function
> restart;                               Clear Maple's memory.
> f := x -> sin(x);                       Let  $f(x) = \sin x$ .
> plot(f(x), x=0..4*Pi);                  Plot the graph of  $f$  over the interval  $[0, 4\pi]$ .
```

b) Continue by typing the following command line into Maple.

```
> plot({f(x), f(2*x), f(x/2), 2*f(x), f(x)/2}, x=0..4*Pi);
> plot({f(x), f(x+Pi/4), f(x-Pi/4), f(x)+Pi/4, f(x)-Pi/4}, x=0..4*Pi);
```

At this point, make a hard-copy of your typed input and Maple's responses. Then ...

c) label the curves in each of the plots you produced in part (b). For example, label the graph of $f(x) = \sin x$ in each plot by " $f(x) = \sin x$ ". (If your hard-copy will not be in color, it might be useful to refer to the color output on your computer monitor when doing this labeling.)