

Extra Project 7.4d: Exponentials, Logarithms, and Their Derivatives**Objective**

To compare the behavior of various exponential and logarithmic functions, and their derivatives.

Narrative

If you have not already done so, read Section 7.4 in the text.

In this project you will differentiate and use the `plot` command to plot several exponential and logarithmic functions on one set of coordinate axes.

Tasks

1. Type the command lines below into Maple in the order in which they are listed. These commands produce graphs of various exponential and logarithmic functions, and their derivatives.

```
> # Project 7.4d: Exponentials, Logarithms, and Their Derivatives
> restart;
> f := x -> sin(x)+ln(x);
> diff(f(x),x);
> plot({f(x),diff(f(x),x)},x=-10..10,y=-10..10);
> f := x -> ln(x^2+x+1);
> diff(f(x),x);
> plot({f(x),diff(f(x),x)},x=-10..10,y=-10..10);
> f := x -> ln(2*x+x*sin(x));
> diff(f(x),x);
> diff(f(x),x,x);
> plot({f(x),diff(f(x),x),diff(f(x),x,x)},x=-10..10,y=-10..10);
> f := x -> exp(sin(5*x));
> diff(f(x),x);
> plot({f(x),diff(f(x),x)},x=-2..2);
> f := x -> exp(x)/(1+x);
> diff(f(x),x);
> plot({f(x),diff(f(x),x)},x=-5..5,y=-5..5);
```

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

2. Label by hand each of the curves in each of the graphics you created in part (1).