Differentiation practice I

■ **1 Compute the derivative.**

```
f[x_] = x^15 + 4 x^13 + 5 x^7 + 3 x + 4;
∂x f[x]
```

■ **2 Compute the derivative.**

```
f[x_] = 3 / (x^3 + 2 x + 5);
∂x f[x]
```

■ **3 Compute the derivative.**

```
f[x_] = (x^2 - 4) / (x^2 + 4);
∂x f[x]
Together[%]
```

■ **4 Compute the derivative.**

```
f[x_] = (x^2 + 3 x + 5) / (x^2 + 4);
Together[∂x f[x]]
```

■ **5 Simplify first, then compute the derivative.**

```
f[x_] = (x^3 - 1/(x^2+1)) / (x^4 + 1/(x^2+1));
g[x_] := Simplify[f[x]]
g[x]

Together[∂x g[x]]
```

■ **6 Simplify first, then compute the derivative.**

```
f[x_] = 1 / (1 - 2 x/(x^2+1));
g[x_] := Simplify[f[x]];
g[x]
Together[∂x g[x]]
```

■ **7 Compute the derivative.**

```
f[x_] := x^(1/7) + 3 x^13 + 1/x^(1/7);
∂x f[x]
```

■ **8 Compute the derivative.**

```
f[x_] := (x^(1/7) + 3 x^13) / (x^(1/4) + 2 x^4)
∂x f[x]
Together[%]
```

■ **9 Compute the derivative.**

```
f[x_] = Sqrt[x^2 + 1];
∂x f[x]
```

■ **10 Compute the derivative.**

```
f[x_] = 1 / Sqrt[x^2 + 1];
∂x f[x]
```

■ **11 Compute the derivative.**

```
f[x_] := Sqrt[Sqrt[x^2 + 1] + 1];
∂x f[x]
```

■ **12 Compute the derivative**

```
f[x_] = Sin[x] (x^15 + 4 x^13);
∂x f[x]
```

■ **13 Compute the derivative.**

```
f[x_] = Sin[x]^2 (x^15 + 4 x^13);
∂x f[x]
```

■ **14 Compute the derivative.**

```
f[x_] = Tan[x] / (x^3 + 2 x + 5);
∂x f[x]
```

■ **15 Compute the derivative.**

```
f[x_] = Sin[x] Cos[x];
∂x f[x]
```

■ **16 Compute the derivative.**

```
f[x_] := Sin[x] ℯ^x;
∂x f[x]
```

■ **17 Compute the derivative.**

```
f[x_] = ℯ^x / Sin[x];
∂x f[x]
Simplify[∂x f[x]]
```

■ **18 Compute the derivative.**

```
f[x_] = Sin[x] / (x^2 + 4);
∂x f[x]
Simplify[∂x f[x]]
```

■ **19 Compute the derivative.**

```
f[x_] = (x^2 + 3 x + 5)/Cos[x];
∂x f[x]
```

■ **20 Compute the derivative.**

```
f[x_] = ((x^2 + 2) Sec[x])/(x^5 - x^3 + 1);
∂x f[x]
Simplify[%]
```

■ **21 Compute the derivative.**

```
f[x_] = Tan[1/Sqrt[x^2 + 1]];
∂x f[x]
```

■ **22 Compute the derivative.**

```
f[x_] = Log[Sin[x]^2 + 5];
∂x f[x]
```

■ **23 Compute the derivative.**

```
f[x_] = e^(Sin[x]^2+5);
∂x f[x]
```

■ **24 Compute the derivative. Log[10,x] means log base 10 of x.**

```
f[x_] = Log[10, x];
∂x f[x]
```

■ **25 Compute the derivative.**

```
f[x_] = 10^Sqrt[x^2+1] ;
∂x f[x]
```

■ **26 Compute the derivative.**

```
f[x_] = Sqrt[10^x + 1] ;
∂x f[x]
```

■ **27 Compute the derivative.**

```
f[x_] = (e^-x + e^x)^5;
∂x f[x]
```

■ **28 Compute the derivative.**

```
f[x_] = Sqrt[Sqrt[Sin[x]] + 1] ;
∂x f[x]
```

■ **29 Compute the derivative.**

```
f[x_] = (x^2 + 3 x + 5)/Cos[x];
∂x f[x]
```

■ **30 Compute the derivative.**

```
f[x_] = (x + 1)^11 / (x - 1)^11;
Simplify[Together[∂x f[x]]]
```