Maple Lab 1

Maple is a mathematical software first developed by the University of Waterloo in the 1980s, later developed commercially by the company Maplesoft.

1 Practice

Type the following, then press `Enter`.

(1) `35/6`

(2) `evalf(35/6)`

(3) `sqrt(2), |-7|`

(4) `evalf(%)`

(5) `34^100`

(6) `x:=2`

(7) `y:=x^2`

(8) `y:=x^3:` (with the colon)

(9) `y`

(10) $\frac{2^3}{3^4}$ (highlight 2^3, then press the forward slash to jump to the denominator)

(11) $\frac{x+y+z}{3}$

(12) e^2 (then Shift+Enter) `evalf(%)`

(13) `exp(2);` (then Shift+Enter) `evalf(%)`

(14) `a:=ln(2);` (then Shift+Enter) `evalf(a)`

(15) `sin(pi),pi^2,sin(Pi),Pi^2`

(16) `f:=x->x^2`

(17) `f(2)`

(18) `plot(f(x),x=-2..2)`
Right click on the plot, then choose Title. Enter the title $f(x) = x^2$. To enter in math mode, click the Math button on the menu bar.

(19) `plot(f(x),x=-2..2,gridlines)`

(20) `?plot`

(21) `g:=x->sin(x)*cos(x);` (then Shift+Enter) `plot(g(x),x=-2..2)`

(22) `f(g(x));` (then Shift+Enter) `g(f(x))`

(23) `plot([f(x),g(x)],x=-2..2)`

(24) `plot([x,x^2,x^3],x=0..1.2)`

(25) `f := x->piecewise(0 < x < 1, x, 1 < x < 2, 2, x > 2, 3 - x)`

(26) `plot(f(x),x=0..3)`

(27) `limit(f(x),x=1), limit(f(x),x=1,left)`

Tip: to insert a computation cell before a current cell, press Ctrl + Shift + K. To insert one after, press Ctrl + Shift + J.

2 Exercises

1. Graph the rational function $R(x) = \frac{3x^2-3x}{x^2+x-12}$ on the interval $[-10, 10]$. How does $f(x)$ behave when x is close to 3?

2. Graph the functions $\sin x$, $\sin 2x$, $\sin 3x$, $\sin 4x$, $\sin 5x$ on the same plot. What does the graph of $\sin nx$ look like if n is a very large number?

3. Graph the functions $\log_2(x)$, $\log_3(x)$, $\log_4(x)$, $\log_5(x)$ on the same plot. What does the graph of $\log_n(x)$ look like if n is a very large number?

4. Let $f(x) = \frac{x}{|x|}(1 - x)$

   (a) Graph the function on the interval $[-2, 2]$.

   (b) Find $\lim_{x\to 0} f(x)$, $\lim_{x\to 0^-} f(x)$, $\lim_{x\to 0^+} f(x)$.

   (c) Express f as a piecewise function.