

Student Package

The commands in this package can be used after typing with(student); Examples of some of them are listed below.

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| distance([2,3],[4,6]); | Computes the distance between 2 points. |
| leftbox(x^2,x=0..2,10); | Plots 10 rectangles under the curve with height of the left endpoint of each subinterval. The rightbox and middlebox commands are similar. |
| leftsum(x^2,x=0..2,10); | Writes the leftsum with 10 subdivisions in sigma form. |
| evalf(%); | Evaluates the sum. |
| showtangent(x^2,x=2); | Plots the curve $f(x) = x^2$ and its tangent line at $x = 2$. |

Derivatives

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| diff(x^3+3*x^2-2*x+1,x); | Finds the derivative of $y = x^3 + 3x^2 - 2x + 1$ |
| diff(x^3+3*x^2-2*x+1,x,x); | Finds the second derivative. Instead of x,x, x\$2 can be used. |
| a:=diff(x^2*y(x)+2*x*y(x)^2+3*x-4*y(x),x); solve(a,diff(y(x),x)); | Differentiates implicitly. |
| f:=x->x^2-3*x+4; | Names f as a function of x. |
| fx:=D(f); | D(f) takes the derivative and makes it a function of x. |
| fx(3); | Evaluates the derivative at x=3. |
| g:=(x,y)->x^2+2*x*y+y^3; | Names g as a function of x and y. |
| gx:=D[1](g); | Takes the partial derivative with respect to x, the first variable listed. |
| gy:=D[2](g); | Takes the partial derivative w.r.t. y. |

Integrals

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| int(x^2-3*x+1,x); | Finds an antiderivative. |
| int(x^2-3*x+1,x=1..4); | Finds the definite integral. |
| fsolve(int(exp(-x^2/2),x=0..1)=.2); | Solves the equation. |

Differential Equations

- `f:=diff(y(x),x)=x/y(x);` Inputs the equation $\frac{dy}{dx} = \frac{x}{y}$
- `dsolve(f,y(x));` Solves the differential equation.
- `dsolve({f,y(2)=1},y(x));` Solves it with an initial condition. { } are necessary for solving more than one equation.
- `g:=diff(y(x),x,x)-3*diff(y(x),x)-10*y(x)=0;` Inputs $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} - 10y = 0$
- `dsolve({g,y(0)=2,y(3)=4},y(x));` Solves it with the initial conditions.