> *restart*

> *Ecua* := *diff*(*y*(*x*), *x*$2) + *y*(*x*) = 4·*x*·cos(*x*)

$$Ecua := \frac{d^2}{dx^2}\,y(x) + y(x) = 4\,x\cos(x) \tag{1}$$

> *CondIni* := *y*(0) = -Pi, D(*y*)(0) = Pi

$$CondIni := y(0) = -\pi, \mathrm{D}(y)(0) = \pi \tag{2}$$

> *evalf*(%)

$$y(0) = -3.141592654, \mathrm{D}(y)(0) = 3.141592654 \tag{3}$$

> *with*(*inttrans*) :

> *EcuaTL* := *subs*(*CondIni*, *laplace*(*Ecua*, *x*, *s*))

$$EcuaTL := s^2\,laplace(y(x), x, s) - \pi + s\,\pi + laplace(y(x), x, s) = \frac{4\,(s^2-1)}{(s^2+1)^2} \tag{4}$$

> *SolTL* := *isolate*(*EcuaTL*, *laplace*(*y*(*x*), *x*, *s*))

$$SolTL := laplace(y(x), x, s) = \frac{\dfrac{4\,(s^2-1)}{(s^2+1)^2} - s\,\pi + \pi}{s^2+1} \tag{5}$$

> *SolPart* := *simplify*(*invlaplace*(*SolTL*, *s*, *x*))

$$SolPart := y(x) = \sin(x)\,x^2 + \sin(x)\,\pi - \cos(x)\,\pi + x\cos(x) - \sin(x) \tag{6}$$

> *Comprobar* := *eval*(*subs*(*y*(*x*) = *rhs*(*SolPart*), *lhs*(*Ecua*) − *rhs*(*Ecua*) = 0))

$$Comprobar := 0 = 0 \tag{7}$$

> *SolUno* := *simplify*(*subs*(*x* = 0, *SolPart*))

$$SolUno := y(0) = -\pi \tag{8}$$

> *SolDos* := D(*y*)(0) = *simplify*(*subs*(*x* = 0, *rhs*(*diff*(*SolPart*, *x*))))

$$SolDos := \mathrm{D}(y)(0) = \pi \tag{9}$$

> *CondIni*

$$y(0) = -\pi, \mathrm{D}(y)(0) = \pi \tag{10}$$

> *restart*

> *f* := Heaviside(*t* − 5)

$$f := \text{Heaviside}(t-5) \tag{11}$$

> *plot*(*f*, *t* = -5 ..10, *y* = -2 ..2)
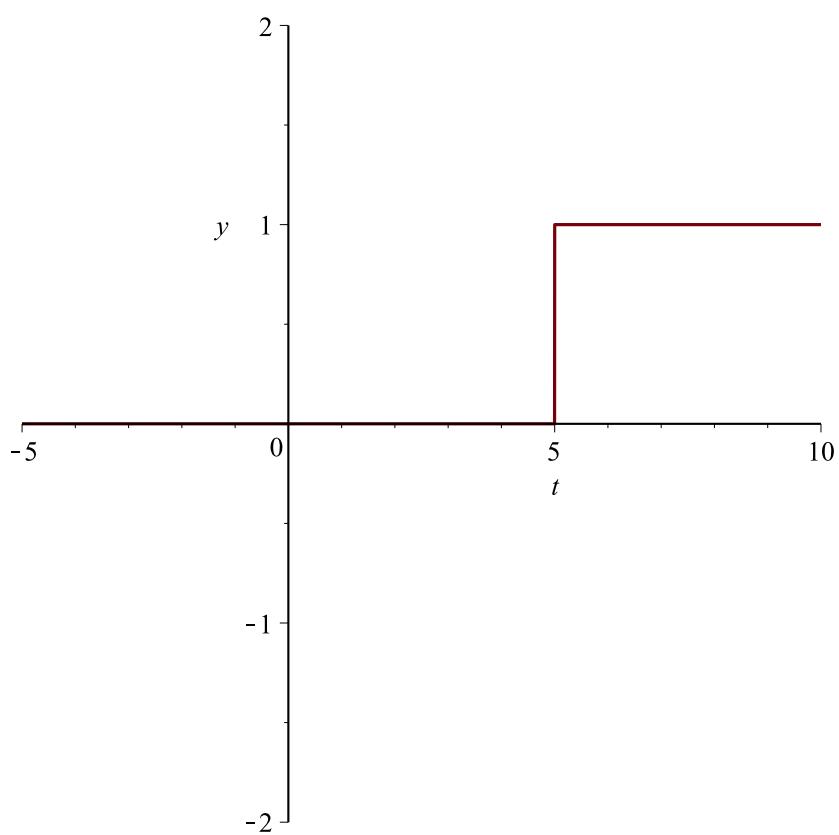
> $with(inttrans)$:

> $F := laplace(f, t, s)$

$$F := \frac{e^{-5s}}{s}$$ **(12)**

> $r := (t - 5) \cdot \text{Heaviside}(t - 5)$

$$r := (t - 5)\ \text{Heaviside}(t - 5)$$ **(13)**

> $plot(r, t = -5..10, y = -2..6, scaling = CONSTRAINED)$
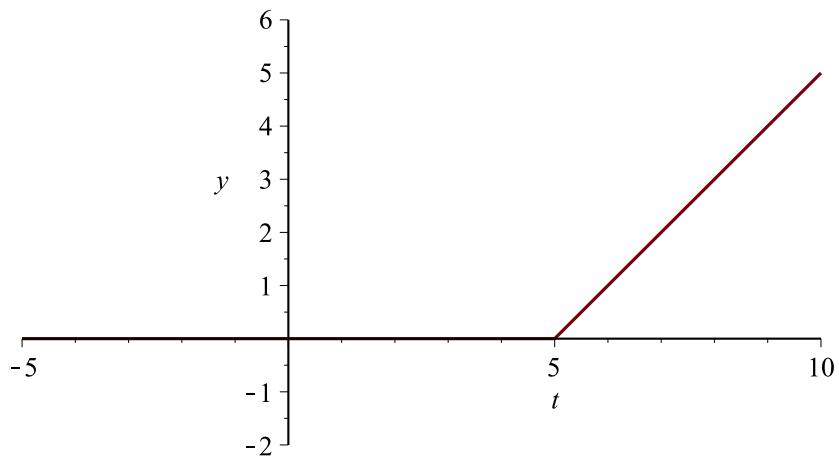
> $R := laplace(r, t, s)$

$$R := \frac{e^{-5s}}{s^2} \tag{14}$$

> delta $:= Dirac(t-5)$

$$\delta := Dirac(t-5) \tag{15}$$

> $DELTA := laplace(\text{delta}, t, s)$

$$DELTA := e^{-5s} \tag{16}$$

>