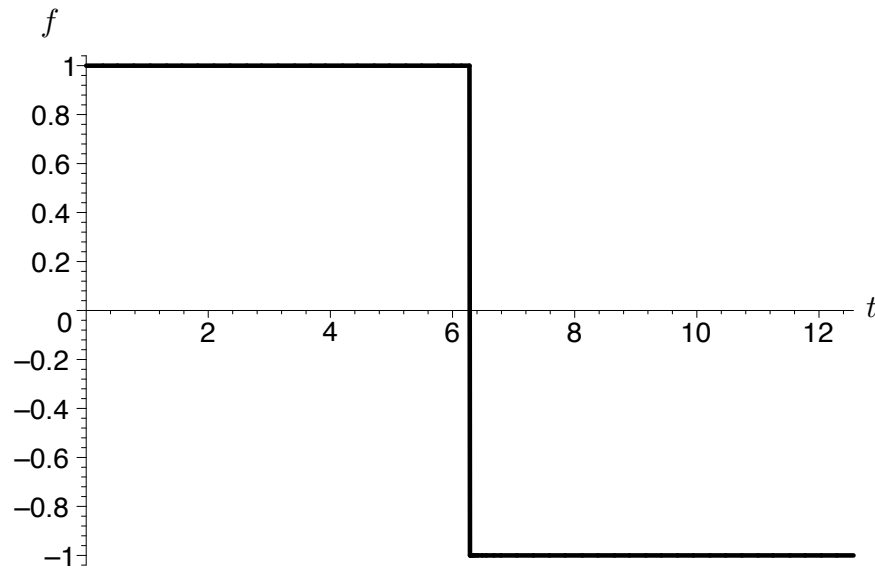


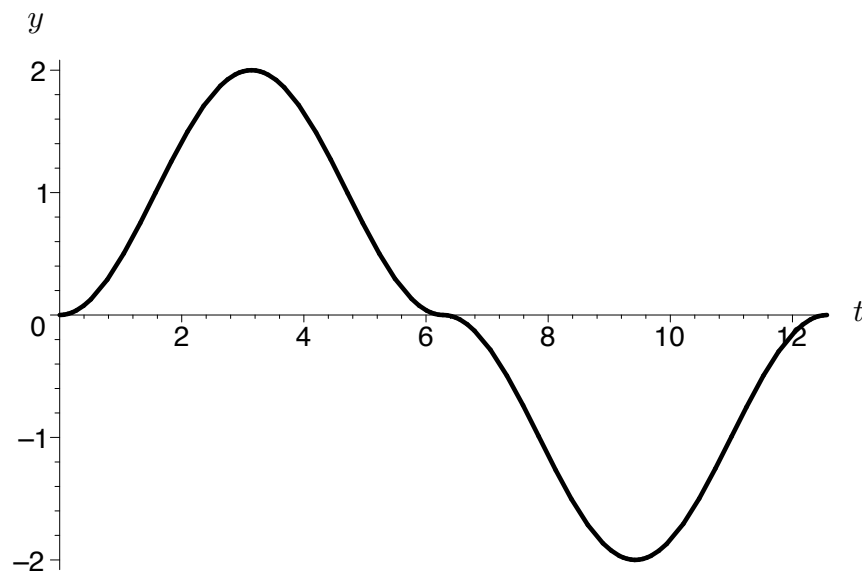
## Simple Step Forcing

Graphed below is the forcing function  $f(t) = 1 - 2u_{2\pi}(t)$  for  $t \in [0, 4\pi]$ .

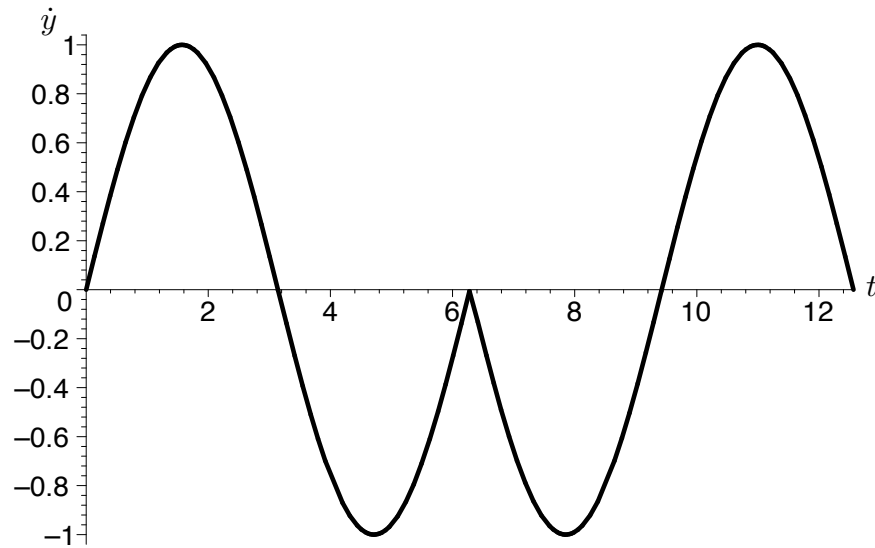


Here is a graph of the solution (for the same interval) of

$$\ddot{y} + y = f(t), \quad y(0) = \dot{y}(0) = 0.$$



Here is a graph of  $\dot{y}$  vs.  $t$  for the same range. Again, there are no discontinuities, but we see that the derivative of  $\dot{y}$  (namely  $\ddot{y}$ ) is discontinuous.



Here is a graph of  $\ddot{y}$  vs.  $t$  for the same range. Since  $y$  and  $\dot{y}$  are continuous, but the forcing is not,  $\ddot{y}$  must be discontinuous.

