By direct computation, one shows that
\[ y'(t) = Ce^{-(1/2)t} \frac{1}{2} (-2t) = -ty(t). \]
The family of solutions for \( C = -3, -2, \ldots, 3 \) is plotted below.

By direct computation, one shows that \( y(t) = 4/(1 - 5e^{-4t}) \) satisfies \( y' = y(4 - y) \) and \( y(0) = -1 \). For the function \( y(t) \) to be well defined, \( t \neq (\ln 5)/4 \). Since the initial condition is \( y(0) = 1 \), the interval of existence is \((-\infty, (\ln 5)/4)\).
**B 13/2.1** Substituting $y(1) = 2$ in the general solution $y(t) = (1/3)t^2 + C/t$, we get $1/3 + C = 2$, hence $C = 5/3$. The interval of existence is $(0, \infty)$.

**B 18/2.1** At each integer valued coordinates $(t, y)$, one needs to draw a short line of slope $f(t, y) = y^2 - t$. For example at $(-2, -1)$ the slope is 5, etc.

**B 24/2.1** Use DFIELD6 to plot the direction field.
The command `dsolve('Dy=-2*t*y', 'y(0)=1')` gives you the solution $\text{ans} = \exp(-t^2)$ and its graph can be plotted with the command `ezplot(ans, [-2,2])`.

Using either `ezplot` (or `plot`) one obtains the following plots of the two curves.