Solution 23.13

(a) Create the M-file function:

```
function y=f(t)
y=9.81*70/12*(1-exp(-12/70*t));
```

Then implement the following MATLAB session:

(b)

$$d(t) = \frac{gm}{c} \int_0^t \left(1 - e^{-(c/m)t} \right) dt$$

$$d(t) = \frac{gm}{c} \left[t + \frac{m}{c} e^{-(c/m)t} \right]_0^t$$

$$d(10) = \frac{9.81(70)}{12} \left[10 + \frac{70}{12} e^{-(12/70)10} - 0 - \frac{70}{12} \right] = 298.5546$$

(c) Implement the following MATLAB session:

(d)

$$a(t) = \frac{gm}{c} \frac{d}{dt} \left(1 - e^{-(c/m)t} \right)$$

$$a(t) = ge^{-(c/m)t}$$

$$a(10) = 9.81e^{-(12/70)10} = 1.766706$$

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