① ⓐ $f'(x) = \sec x(\sec x + \tan x)$, $f(0) = 3$

$= \sec^2 x + \sec\tan x$

we know $\frac{d}{dx}\tan x = \sec^2 x$ and $\frac{d}{dx}\sec x = \sec x \tan x$

so:

$\boxed{f(x) = \tan x + \sec x + c}$

$f(0) = 3 = \tan(0) + \sec(0) + c$

$3 = 0 + 1 + c$ so then $\boxed{c=2}$

$\boxed{f(x) = \tan x + \sec x + 2}$

ⓑ $v(t) = e^t - 1$, $s(0) = 5$

Recall $s'(t) = v(t)$ so then

$s(t) = e^t - t + c$

$s(0) = 5 = e^0 - 0 + c = 1 + c$ so $\boxed{c=4}$

$\boxed{s(t) = e^t - t + 4}$

ⓒ $f'(x) = \frac{2}{x} + \sqrt{x}$, $f(1) = 4$

we know $\frac{d}{dx}\ln x = \frac{1}{x}$ and $\frac{d}{dx}\frac{2}{3}x^{3/2} = \frac{2}{3}\cdot\frac{3}{2}x^{1/2}$

$= \sqrt{x}$ so

$f(x) = 2\ln x + \frac{2}{3}x^{3/2} + c$

$f(1) = 4 = 2\ln(1) + \frac{2}{3}(1)^{3/2} + c$

$4 = 0 + 1 + c$ so $\boxed{c=3}$

$\boxed{f(x) = 2\ln x + 2/3\, x^{3/2} + 3}$

(d) $a(t) = -32$ $v(0) = 2$ $s(0) = 5$

we know $a(t) = v'(t) = s''(t)$ so

$v(t) = -32t + c$ and $v(0) = 2 = -32(0) + c_1$

so $\boxed{c_1 = 2}$

$\boxed{v(t) = -32t + 2}$

we know $\frac{d}{dt}(-16t^2) = -32t$ so then

$s(t) = -16t^2 + 2t + c_2$ and $s(0) = 5 = -16 \cdot 0 + 2 \cdot 0 + c_2$

so $\boxed{c_2 = 5}$

$\boxed{s(t) = -16t^2 + 2t + 5}$