c)

$$sY(s) - 5Y(s) = 2\cdot\frac{s}{s^2+1} - \frac{3}{s^2+9}$$

$$(s-5)Y(s) = \frac{2s}{s^2+1} - \frac{3}{s^2+9}$$

$$Y(s) = \frac{2s}{(s^2+1)\cdot(s-5)} - \frac{3}{(s^2+9)\cdot(s-5)}$$

$$= \frac{2s}{s^3-5s^2+s-5} - \frac{3}{s^3-5s^2+9s-45}$$

$$y(t) = -\frac{10}{26}\cdot\left(-e^{5t} + \cos(t) + \frac{1}{5}\sin(t)\right)$$

$$-3\frac{3}{34}\cdot\left(e^{5t} - \cos(3t) + \frac{5}{3}\sin(3t)\right)$$

$t = t$
$a = -5$
$b = 3$

d)

$$sY(s) - 2 + 4Y(s) = \frac{1}{s^2}$$

$$(s+4)\cdot Y(s) = \frac{1}{s^2} + 2$$

$$Y(s) = \frac{1}{s^2\cdot(s+4)} + \frac{2}{s+4}$$

$2 = a$

$$y(t) = \frac{1}{16}\left(e^{-4t} + 4t - 1\right) + 2e^{-4t}$$

$$y(t) = \frac{1}{16}\left(e^{-4t} + 4t - 1\right) + \left(\frac{1}{16}(29e^{4} - 1)\right)e^{-4t}$$