

$$1. F(s) = \frac{2e^{-s}}{s^2} - \frac{2e^{-3s}}{s^2} - \frac{4e^{-3s}}{s}.$$

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

$$3. (a) x(t) = \frac{2}{5}(e^t - 4e^{-4t}) + \frac{A}{5}H(t-2)(e^{(t-2)} - 4e^{-4(t-2)}). \quad (b) A = -2e^2.$$

$$4. f(x) = \frac{1}{5} \sum_{n=0}^{\infty} (-1)^n \frac{2^n}{5^n} (x-1)^n, \quad |x-1| < 5/2,$$

$$5. 2^\nu / \Gamma(1-\nu), \quad -\sqrt{2/\pi}.$$

$$6. (b) r(r-3) = 0.$$

$$(c) y_1(x) = \sum_{n=0}^{\infty} a_n (x-1)^{n+3}, \quad y_2(x) = C y_1(x) \ln|x-1| + \sum_{n=0}^{\infty} b_n (x-1)^n, \quad a_0, b_0 \neq 0.$$

(d) all x .

$$7. (b) b_3; \quad (c) y_2(x) = \frac{1}{2}x^2 \ln x + \frac{1}{x} - \frac{3}{2} + \frac{3}{2}x - \frac{1}{8}x^3 + \cdots;$$

$$(d) b_n = (-1)^{n+1} \frac{3}{n!(n-3)}.$$

$$8. (a) y(x) = c_1 J_0(2x^{1/2}) + c_2 Y_0(2x^{1/2}). \quad (b) c_1 = 3, c_2 = 0.$$