

$$(1) \frac{1}{x+3} - \frac{1}{x+7}$$

$$\frac{x+7-x-3}{(x+3)(x+7)} = \frac{4}{(x+3)(x+7)}; \int \frac{dx}{x+3} - \int \frac{dx}{x+7} \\ = \ln|x+3| - \ln|x+7| + C$$

$$(2) \frac{1}{x-3} - \frac{1}{x+3}$$

$$\frac{x+3-x-3}{(x-3)(x+3)} = \frac{6}{x^2-9}; \int \frac{dx}{x-3} - \int \frac{dx}{x+3} \\ = \ln|x-3| - \ln|x+3| + C$$

$$(3) \frac{-2}{x-3} + \frac{2}{x}$$

$$\int \frac{-2dx}{x-3} + \int \frac{2dx}{x} = -2\ln|x-3| + 2\ln|x| + C$$

$$(4) \frac{4}{x-5} + \frac{3}{x+2}$$

$$\int \frac{4dx}{x-5} + \int \frac{3dx}{x+2} = 4\ln|x-5| + 3\ln|x+2| + C$$

$$(5) \frac{3}{x+1} - \frac{2}{2x-3}$$

$$(6) \frac{2}{(x-1)^2} - \frac{1}{x-1} + \frac{2}{x}$$

$$(7) -\frac{1}{x^2} + \frac{2}{x} + \frac{3}{x+4}$$

$$(8) \frac{3}{x+1} - \frac{x}{x^2-x+1}$$

$$(9) \frac{3x^2+2x}{x^2-4} = 3 + \frac{2x+12}{x^2-4};$$

$$\int \frac{3x^2+2x}{x^2-4} dx = 3 \int dx + 4 \int \frac{dx}{x-2} - 2 \int \frac{dx}{x+2} \\ = 3x + 4\ln|x-2| - 2\ln|x+2| + C$$

$$\frac{r(x)}{h(x)} = \frac{2x+12}{x^2-4} = \frac{4}{x-2} - \frac{2}{x+2}$$

$$(10) \frac{x^3+2}{x^2-x} = x+1 + \frac{x+2}{x^2-x};$$

$$\int \frac{x^3+2}{x^2-x} dx = 3 \int x dx + \int dx + 3 \int \frac{dx}{x-1} - 2 \int \frac{dx}{x} \\ = \frac{x^2}{2} + x + 3\ln|x-1| - 2\ln|x| + C$$

$$\frac{r(x)}{h(x)} = \frac{x+2}{x^2-x} = \frac{3}{x-1} - \frac{2}{x}$$