Write out the form of the partial fraction decomposition of the function. Do not determine the numerical values of the coefficients.

1) $\dfrac{2x}{(x+3)(3x+1)}$

2) $\dfrac{1}{x^3+2x^2+x}$

3) $\dfrac{2}{x^2+3x-4}$

4) $\dfrac{x^2}{(x-1)(x^2+x+1)}$

5) $\dfrac{x^3}{x^2+4x+3}$

6) $\dfrac{2x+1}{(x+1)^3(x^2+4)^2}$

7) $\dfrac{x^4}{x^4-1}$

8) $\dfrac{t^4+t^2+1}{(t^2+1)(t^2+4)^2}$

Evaluate the integral

9) $\int \dfrac{x}{x-6} dx$

10) $\int \dfrac{r^2}{r+4} dr$

11) $\int \dfrac{x-9}{(x+5)(x-2)} dx$

12) $\int_{2}^{3} \dfrac{1}{x^2-1} dx$

13) $\int_0^1 \dfrac{2x+3}{(x+1)^2}\,dx$

14) $\int_0^1 \dfrac{x^3-4x-10}{x^2-x-6}\,dx$

15) $\int \dfrac{x^2}{(x+1)^3}\,dx$

16) $\int \dfrac{x^4+1}{x(x^2+1)^2}\,dx$

Make a substitution to express the integrand as a rational function and then evaluate the integral.

17) $\int \dfrac{1}{\sqrt{x} - \sqrt[3]{x}}\, dx$ [Hint: substitute $u = \sqrt[6]{x}$]

18) $\int \dfrac{e^{2x}}{e^{2x} + 3e^{x} + 2}\, dx$