

Evaluate the following integrals.

1) $\int \frac{x^3 - 3x + 1}{x^2 - 1} dx.$

2) $\int \frac{x - 2}{x^2 - x - 6} dx.$

3) $\int \frac{x^2 + x}{x^3 - x^2 + 4x - 4} dx.$

4) $\int \frac{x - 5}{x^2 + 6x + 8} dx.$

5) $\int \frac{x + 1}{x^3 - 7x + 6} dx.$

6) $\int \frac{x^2 + 8x + 8}{x^4 - 8x^2 + 16} dx.$

7) $\int \frac{x + 1}{x^2 + 4x + 4} dx.$

8) Use partial fractions decomposition to solve the differential equation

$$\frac{dP}{dt} = 0.1P - 0.02P^2, \quad P(0) = 1000.$$