

Integrate the following.

$$1) \int \frac{dx}{(7-x)^6}$$

$$2) \int \frac{x}{3x^2 - 6} dx$$

$$3) \int x^3(x^4 - 10)^4 dx$$

$$4) \int \frac{dx}{x^2 + 25}$$

$$5) \int \tan^5 x \sec^2 x dx$$

$$6) \int \sqrt[7]{\cot t} \csc^2 t dt$$

Use an integration technique(antiderivative) to evaluate the following

$$7) \int_{-1}^0 \frac{2t}{(4+t^2)^3} dt$$

$$8) \int_{-\pi}^0 \cos^4\left(\frac{x}{2}\right) \sin\left(\frac{x}{2}\right) dx$$

$$9) \int_{-5}^6 \frac{x dx}{4x^2 + 3}$$

Use separation of variables to solve the initial value problem.

10) $\frac{dy}{dx} = \frac{5 - x^2}{3y}$ and $y = -1$ when $x = 0$

Use Euler's method to solve the initial value problem.

11) $\frac{dy}{dx} = x + y$ and $y = 1$ when $x = 1$

Use Euler's method with increments of $\Delta x = 0.1$ to approximate the value of y when $x = 1.2$