

§4.9: ANTIDERIVATIVES

1.] Find the antiderivative of the following functions:

a.) $f(x) = 100x^{99}$

b.) $g(x) = -\frac{1}{\sqrt{1-x^2}}$

c.) $h(x) = \sec(x) \tan(x)$

2.] Compute the following indefinite integrals:

a.) $\int 20x^{19} dx$

b.) $\int -\csc^2(x) dx$

c.) $\int \frac{1}{x} dx$

3.] Use the sum/difference and constant multiple rule for integration to compute the following indefinite integrals:

a.) $\int (4x^3 + 1 + \cos(x)) dx$

b.) $\int (x^2 + 3x + \sin(x)) dx$

c.) $\int 2^x dx$

4.] Use the power rule for integration to compute the following indefinite integrals:

a.) $\int (3x^5 + 2 - 5x^{-2/3}) \, dx$

b.) $\int (x^2 + 1)(2x - 5) \, dx$

c.) $\int \left(\frac{4x^{19} - 5x^{-8}}{x^2} \right) \, dx$

5.] Solve the initial value problem given by

$$f'(x) = 7x \left(x^6 - \frac{1}{7} \right) \quad f(1) = 2.$$

6.] Suppose the acceleration function of an object moving along a line is given by $a(t) = 0.2t$. Find the position function of the object if you know the initial velocity was $v(0) = -3$ and initial position was $s(0) = 1$.