

State as precisely as you can the Fundamental Theorem of Calculus.

Find the following anti derivatives. Please show work, be careful with the coefficients, and label the answer.

1.  $\int \sin(\pi x) dx$

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

2.  $\int \cos^2(x) \sin(x) dx$

4.  $\int \log(x^4) dx$

1.  $\int x e^x dx$

$$\int_0^2 x e^x dx$$

2.  $\int x^2 \log(x) dx$

3.  $\int x^3 \sin(x) dx$  (the snap way)

$$4. \int \frac{x^3}{x-1} dx$$

$$5. \int \frac{x}{x-2} dx$$

$$6. \int \frac{x}{(x-1)(x-2)} dx$$

$$7. \int \frac{dx}{\sqrt{1-9x^2}}$$

$$8. \int \frac{dx}{x\sqrt{x^2+4}}$$

$$9. \int_{\frac{1}{2}}^1 \frac{dx}{\sqrt{2x-x^2}}$$

10.  $\int \frac{dx}{1 + \sqrt{x}}$

11.  $\int \frac{dx}{1 + \sqrt{e^x}}$

12.  $\int_1^{\infty} \frac{\log(x)}{x} dx$

13.  $\int_1^{\infty} \frac{dx}{x^2 + x}$