

Integration Trivia

Round 1

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

Answer:

$$-\frac{1}{x} + C$$

2. $\int (2x^4 + 3x^2 + 5) dx$

Answer:

$$\frac{2}{5}x^5 + x^3 + 5x + C$$

3. $\int 6dx$

Answer:

$$6x + C$$

4. $\int \sqrt{x^3} dx$

Answer:

$$\frac{2}{5}x^{\frac{5}{2}} + C$$

Round 2

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

Answer:

$$\frac{1}{2}x^2 - x + C$$

2.
$$\int 3\csc^2 x dx$$

Answer:

$$-3\cot x + C$$

3.
$$\int \frac{4 + 5x^{\frac{3}{2}}}{\sqrt{x}} dx$$

Answer:

$$8x^{\frac{1}{2}} + \frac{5}{2}x^2 + C$$

4.
$$\int \sec x \tan x dx$$

Answer: $\sec x + C$

Round 3

1. $\int_{\frac{\pi}{2}}^{\frac{5\pi}{4}} \sin x \, dx$

Answer: $\frac{\sqrt{2}}{2} = .71$

2. $\int_3^5 \frac{x(x+5)(x+1) + 5}{x+5} \, dx$

Answer: **10**

Hint: U-Sub

$$3. \int x^2(x^3 + 5)^3 dx$$

Answer: $\frac{1}{12}(x^3 + 5)^4 + C$

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

Answer: $-\frac{1}{12}(8-4x^2)^{\frac{3}{2}} + c$

Round 4

1. $\int \cos 3x \, dx$

Answer: $\frac{1}{3} \sin 3x + C$

2. $\int \frac{1}{\sqrt{2x+1}} \, dx$

Answer: $\sqrt{2x+1} + C$

3. $\int \sin^3 3x \cos 3x dx$

$$\frac{1}{3} \int u^3 du$$

$$\frac{1}{3} \cdot \frac{1}{4} u^4 =$$

$$u = \sin 3x$$

$$du = \cos 3x \cdot 3 dx$$

$$\underline{3 \cos 3x dx}$$

Answer: $\frac{1}{12} \sin^4 3x + C$

4. $\int_0^1 x \sqrt{1-x^2} dx$

$$-\frac{1}{2} \int_0^1 u^{\frac{1}{2} + \frac{2}{2}} du$$

$$-\frac{1}{2} \cdot \frac{2}{3} u^{3/2}$$

$$u = 1 - x^2$$

$$du = -2x dx$$

$$= \frac{1}{3} u^{3/2} \Big|_0^1$$

$$0 + \frac{1}{3}$$

Answer: $\frac{1}{3}$