

## Integral Review Sheet

1)  $\int \frac{\ln x}{x} dx$

2)  $\int x^2 \ln x dx$

3)  $\int x\sqrt{x^2+1} dx$

4)  $\int xe^{2x} dx$

5)  $\int x \cos(5x) dx$

6)  $\int \arctan x dx$

7)  $\int \sin^3 x \cos^2 x dx$

8)  $\int_0^{\pi/2} \sin^2(2x) dx$

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

10)  $\int \tan^3 x \sec^2 x dx$

11)  $\int \frac{1 - \sin x}{\cos x} dx$

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

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

14)  $\int \frac{1}{\sqrt{4-x^2}} dx$

15)  $\int \sqrt{4-x^2} dx$

16)  $\int \frac{1}{\sqrt{x^2+4}} dx$

17)  $\int \frac{1}{x^2-4} dx$

18)  $\int \frac{x}{x-6} dx$

19)  $\int \frac{x}{(x+1)(x+2)} dx$

20)  $\int \frac{1}{x(x^2+1)} dx$

## ANSWERS

$$1) \frac{1}{2} (\ln x)^2$$

$$u = \ln x$$

$$2) \frac{1}{3} x^3 \ln x - \frac{1}{9} x^3$$

$$u = \ln x, dv = x^3 dx$$

$$3) \frac{1}{3} (x^2 + 1)^{3/2}$$

$$u = x^2 + 1$$

$$4) \frac{1}{2} x e^{2x} - \frac{1}{4} e^{2x}$$

$$u = x, dv = e^{2x} dx$$

$$5) \frac{1}{5} x \sin(5x) + \frac{1}{25} \cos(5x)$$

$$u = x, dv = \cos(5x) dx$$

$$6) x \arctan x - \frac{1}{2} \ln(x^2 + 1)$$

$$u = \arctan x, dv = dx$$

$$7) \frac{1}{5} \cos^5 x - \frac{1}{3} \cos^3 x$$

$$\int \sin x (1 - \cos^2 x) \cos^2 x dx$$

$$\text{then } u = \cos x$$

$$8) \int_0^{\pi/2} \left( \frac{1}{2} - \frac{1}{2} \cos(4x) \right) dx = \frac{\pi}{4}$$

$$9) \frac{1}{2} \sec^2 x$$

$$u = \sec x \quad du = \sec x \tan x dx$$

$$10) \frac{1}{4} \tan^4 x$$

$$u = \tan x \quad du = \sec^2 x dx$$

$$11) \ln(\cos x) + \ln(\tan x + \sec x) \quad I = \int (\sec x - \tan x) dx$$

and supplied tables

$$12) \sqrt{4 + x^2}$$

$$u = x^2 + 4$$

$$13) \frac{1}{2} \arctan\left(\frac{x}{2}\right)$$

$$u = \frac{x}{2}$$

$$14) \arcsin\left(\frac{x}{2}\right)$$

$$x = 2\sin u, dx = 2\cos u du$$

$$15) \frac{1}{2}x\sqrt{4-x^2} + 2\arcsin\left(\frac{x}{2}\right)$$

same as in 14) above

$$16) \ln\left(\frac{x}{2} + \frac{1}{2}\sqrt{x^2+4}\right)$$

$$x = 2\tan u \\ dx = 2\sec^2 u du$$

$$17) \int \frac{1}{4(x-2)} - \frac{1}{4(x+2)} dx = \frac{1}{4} \ln|x-2| - \frac{1}{4} \ln|x+2|$$

$$18) \int \left(1 + \frac{6}{x-6}\right) dx = x + 6 \ln|x-6|$$

$$19) \int \frac{2}{x+2} - \frac{1}{x+1} dx = 2 \ln|x+2| - \ln|x+1|$$

$$20) \int \left(\frac{1}{x} - \frac{x}{x^2+1}\right) dx = \ln|x| - \frac{1}{2} \ln|x^2+1|$$