

INTRODUCTION TO CALCULUS

MATH 1A

UNIT 24: WORKSHEET

Integral Drill

Problem 1: Level 1

- a) $\int x^5 dx$
- b) $\int \sin(x) dx$
- c) $\int \frac{1}{x} dx$

Solution:

- a) $x^6/6 + C$
- b) $-\cos(x) + C$
- c) $\ln(x) + C$

Problem 2: Level 2

- a) $\int 4x^{-3} dx$
- b) $\int \cos(3x) dx$
- c) $\int \frac{1}{1+x^2} dx$

Solution:

- a) $-2x^{-2} + C$
- b) $\sin(3x)/3 + C$
- c) $\arctan(x) + C$

Problem 3: Level 3

- a) $\int x^5 + x^2 + x + 1 dx$
- b) $\int \sin(14x) + \cos(3x) + \frac{1}{x^2} dx$
- c) $\int 17 \frac{1}{\cos^2(x)} + x^9 dx$

Solution:

- a) $x^6/5 + x^3/3 + x^2/2 + x + C$
 b) $-\cos(14x)/14 + \sin(3x)/3 - \frac{1}{x}$
 c) $17 \tan(x) + \frac{x^{10}}{10}$

Problem 4: Level 4

- a) $\int \frac{1}{7+x} dx$
 b) $\int \sin(3+2x) + \frac{8}{\sin^2(x)} dx$
 c) $\int \cos(x^2)2x dx$

Solution:

- a) $\ln(7+x) + C$
 b) $-\cos(3+2x)/2 - 8 \cot(x)$
 c) $\sin(x^2)$

Problem 5: Level 5

- a) $\int \frac{1}{x \ln(x)} dx$
 b) $\int \sin(9+2x^2)x dx$
 c) $\int \ln(x)/x dx$

Solution:

- a) $\ln(\ln(x)) + C$.
 b) $-\cos(9+2x^2)/4$.
 c) $\ln^2(x)/2 + C$

In case you need some motivation for this drill, we asked midjourney to have some drill sergeant yell at us. We all sometimes need a bit of a push!

