

**Math 100 – WORKSHEET 21**  
**ANTIDERIVATIVES**

1. WARMUP: INVERSE OPERATIONS

- (1) (Multiplication)
- (a) Calculate:  $7 \times 8 =$
  - (b) Find (some)  $a, b$  such that  $ab = 15$ .

- (2) (Trig functions)
- (a) Calculate:  $\sin \frac{\pi}{3} =$
  - (b) Find all  $\theta$  such that  $\sin \theta = 1$ .

- (3) Simple differentiation
- (a) Find one  $f$  such that  $f'(x) = 1$ .

(b) Find *all* such  $f$ .

(c) Find the  $f$  such that  $f(7) = 3$ .

2. ANTIDIFFERENTIATION BY MASSAGING

- (4) Find  $f$  such that  $f'(x) = 2x^3$ .

- (5) Find  $f$  such that  $f'(x) = -\frac{1}{x}$ .

- (6) Find all  $f$  such that  $f'(x) = \cos 3x$ .

### 3. COMBINATIONS

(7) (Final, 2015) Find a function  $f(x)$  such that  $f'(x) = \sin x + \frac{2}{\sqrt{x}}$  and  $f(\pi) = 0$ .

(8) (Final, 2016) Find the general antiderivative of  $f(x) = e^{2x+3}$ .

(9) Find  $f$  such that  $f'(x) = \frac{6x^4 - 2x - 2}{x^2}$ .

(10) Find  $f$  such that  $f'(x) = 2x^{1/3} - x^{-2/3}$  and  $f(1000) = 5$ .

(11) Find  $f$  such that  $f''(x) = \sin x + \cos x$ ,  $f(0) = 0$  and  $f'(0) = 1$ .