

# Discussion Problems for Math 180

Tuesday, April 21, 2015

*Review – take no more than five minutes per question.*

1. Fill in the blank:

(a) A function  $f$  is continuous at  $x = a$  if \_\_\_\_\_.

(b) By definition,  $f'(x) =$  \_\_\_\_\_.

(c) By definition,  $\int_a^b f(x) dx =$  \_\_\_\_\_.

(d) The fundamental theorem of calculus says that \_\_\_\_\_ = \_\_\_\_\_.

2. Given that  $\ln(2) \approx 0.6931$  and  $\ln(12) \approx 2.4849$ , we can say that  $\ln(3) \approx$  \_\_\_\_\_.

3. Calculate  $\frac{d}{dx} \left[ \ln \left( \frac{x^3 - 5x + 1}{x^6 - 5x^4 + 3x - 2} \right) \right]$ . (Hint: think before you calculate!)

*This time*

4. Calculate:

(a)  $\int_0^1 \frac{1}{\sqrt{1-x^2}} dx$

(b)  $\int_0^1 \frac{1}{1+x^2} dx$

(c)  $\int_0^1 \frac{1}{\sqrt{1+x}} dx$

(d)  $\int_0^1 \frac{1}{1+x} dx$

(Parts (c)–(d) will take a little extra thought.)

5. Calculate  $\int_0^{5\pi} |\sin(x)| dx$ . (Hint: sketch the graph first.)

6. What is  $\frac{d}{dx} \int_{-\pi x/2}^{\pi x/2} \ln(\cos(t)) dt$ ?