Math 212 GH Quiz 4B

February 19, 2020

6 + 2 Bonus points possible!

Name: ANSWERS

Instructions: No calculators. Use your own scrap paper and write your answers in the space provided.

1. Simplify or perform the long division: $\frac{x^3+4}{x+1} =$ $x^2 - x + 1 + \frac{3}{x+1}$

2. Write down the partial fraction decomposition of the following. Do NOT solve for the arbitrary constants:

   (a) $\frac{2x^2-7}{x(x-1)^2(x^3+4)} =$ $\frac{A}{x} + \frac{B}{x-1} + \frac{C}{(x-1)^2} + \frac{Dx^2+Ex+F}{x^3+4}$

   (b) $\frac{4-3x^2}{(x^2+7x+6)(x+1)} =$ $\frac{A}{x+6} + \frac{B}{x+1} + \frac{C}{(x+1)^2}$

   (c) $\frac{7}{x^4-x} =$ $\frac{A}{x} + \frac{B}{x-1} + \frac{Cx+D}{x^2+x+1}$

3. Integrate the following:

   (a) $\int \frac{x^3}{\sqrt{1-x^2}}\,dx =$ $\frac{(1-x^2)^{3/2}}{3} - \sqrt{1-x^2} + C$

   (b) $\int \sqrt{\cos 2x + 1}\,\sin x\,dx =$ $\frac{\sqrt{2}}{2}\sin^2 x + C$ OR $-\frac{\sqrt{2}}{2}\cos^2 x + C$ OR $-\frac{\sqrt{2}}{4}\cos 2x + C$

Bonus:

1. In approximating the integral $\int_a^b f(x)\,dx$ with n subintervals, define what Δx is.

   $\Delta x =$ $\frac{b-a}{n}$

2. Name three numerical integration rules used to approximate definite integrals:

Lefthand rule, Righthand rule, Midpoint rule, Trapezoid rule, Simpson's rule (Any three).