Math 212 GH Quiz 4A
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: $\frac{x^3+4}{x+2} =$ $x^2 - 2x + 4 - \frac{4}{x+2}$

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

   (a) $\frac{2x^2-7}{x(x+1)(x^2+1)^2} =$ $\frac{A}{x} + \frac{B}{x+1} + \frac{Cx+D}{x^2+1} + \frac{Ex+F}{(x^2+1)^2}$

   (b) $\frac{4-3x^2}{(x^2+5x+6)(x+2)} =$ $\frac{A}{x+3} + \frac{B}{x+2} + \frac{C}{(x+2)^2}$

   (c) $\frac{7}{x^6-x^3} =$ $\frac{A}{x} + \frac{B}{x^2} + \frac{C}{x^3} + \frac{D}{x-1} + \frac{Ex+F}{x^2+x+1}$

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) $\int \sqrt{\cos 2x + 1}\,dx =$ $\sqrt{2}\sin x + C$

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).