Honors Math 182 Quiz 2 Version A

Feel free to use the computers, your calculator, notes and textbooks while working on this quiz. You may also use online resources such as Wikipedia, Google and Wolfram Alpha; however, do not use email or any other messaging service during the quiz.

Solve the following multiple-choice antiderivative problems:

1. $\int 3x^2 \, dx$

    (A) $x^3 + C$

    (B) $x^3 - 7 + C$

    (C) $(x-1)^3 + 3x^2 - 3x + C$

    (D)   all of the above

2. $\int 2 \sin 2x \, dx$

    (A) $\sin^2 x - \cos^2 x + C$

    (B) $\frac{1}{2} \cos 2x + C$

    (C) $2 \cos 2x + C$

    (D) $\cos 2x + C$
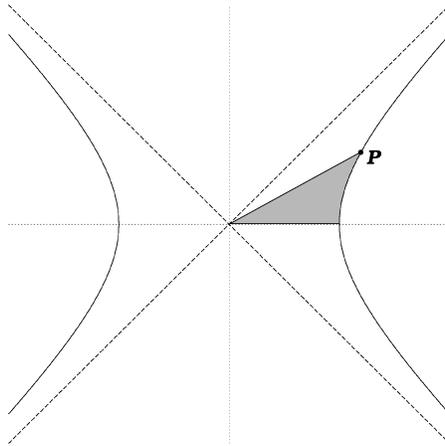
3. $\int \ln \left(\frac{1}{x^2 + 2x + 1} \right) dx$

    (A) $2(x+1)\left(1 + \ln|x+1|\right) + C$

    (B) $-2(x+1)\left(1 + \ln|x+1|\right) + C$

    (C) $2(x+1)\left(1 - \ln|x+1|\right) + C$

    (D) $-2(x+1)\left(1 - \ln|x+1|\right) + C$

4. $\int \frac{1}{\sqrt{4 + x^2}} \, dx$

    (A) $\ln(x + \sqrt{x^2 + 4}) + C$

    (B) $2 \ln(x + \sqrt{x^2 + 4}) + C$

    (C) $\mathrm{asinh}(x/2) + C$

    (D)   both A and C

    (E)   both B and C

5. The hyperbola $x^2 - y^2 = 1$ is depicted below along with a shaded region determined by the point $P = \left(\frac{5}{3}, \frac{4}{3}\right)$.

(i) Find an expression for the exact area of the shaded region.

(ii) Find a decimal approximation for this area that is accurate to at least 5 digits.

6. Find the following derivatives.

(i) $\dfrac{d}{dx}|\sin x|^3$

(ii) $\dfrac{d}{dx}\left(7\arctan x^2\right)$