MATH 14-3D2 Spring 2014

Quiz 9   SOLUTIONS

Show all work clearly and in order (on this sheet or an attached sheet) and circle your final answers.

Justify your answers algebraically whenever possible. Work without justification may not receive credit.

You have 25 minutes to take this 10 point quiz.

1. (*3 points*) Compute

$$\int \sin(x) + x^2 + x^3 dx.$$

Solution: $-\cos(x) + \dfrac{x^3}{3} + \dfrac{x^4}{4} + C$

2. (*3 points*) Compute

$$\int 4x(17x^2 + 1)dx.$$

Solution: $= \displaystyle\int 68x^3 + 4x = \dfrac{68}{4}x^4 + 2x^2$

3. (*4 points*) Compute

$$\int_{-\pi}^{\pi} \cos\left(\frac{x}{2}\right) dx.$$

Solution: Let $u = \dfrac{x}{2}$. Then $du = \dfrac{1}{2}dx$ so $dx = 2du$. Then by substitution,

$$
\begin{aligned}
\int_{-\pi}^{\pi} \cos\left(\frac{x}{2}\right) dx &= 2\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \cos(u)du \\
&= 2\sin(u)\big|_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \\
&= 2\left[\sin\left(\frac{\pi}{2}\right) - \sin\left(\frac{-\pi}{2}\right)\right] \\
&= 2[1 - (-1)] \\
&= 4.
\end{aligned}
$$