

Quiz 22

November 30, 2016

Show all work and circle your final answer.

1. Find the derivative with respect to x of $\int_{(x^2+2x)}^5 \frac{5 - \tan t}{3 + e^{5t} \sin t} dt$.
since x is in the lower bound

$$y' = \left[- \frac{5 - \tan(x^2+2x)}{3 + e^{5(x^2+2x)} \sin(x^2+2x)} \cdot (2x+2) \right]$$

$\uparrow$ chain rule

2. Evaluate $\int_{\pi/2}^{\pi} \cos x \, dx$. $= \sin x \Big|_{\pi/2}^{\pi}$
 $= \sin \pi - \sin \frac{\pi}{2}$
 $= 0 - 1 = \boxed{-1}$

3. Evaluate $\int_1^4 \frac{y^3 + 3y + 2}{\sqrt{y}} + e^y \, dy$
- $$= \int_1^4 y^{5/2} + 3y^{1/2} + 2y^{-1/2} + e^y \, dy$$
- $$= \left[\frac{2}{7} y^{7/2} + 2y^{3/2} + 4y^{1/2} + e^y \right]_1^4$$
- $$= \frac{2}{7} (4)^{7/2} + 2(4)^{3/2} + 4(4)^{1/2} + e^4$$
- $$- \left(\frac{2}{7} + 2 + 4 + e^1 \right)$$
- $$= \frac{256}{7} + 16 + 8 + e^4 - \frac{2}{7} - 2 - 4e^1$$
- $$= \boxed{\frac{380}{7} + e^4 - e}$$

4. Evaluate $\int_1^1 \frac{x^{28}}{x^3 - 54} \, dx$.

$$= \boxed{0}$$

(since $\int_a^a f(x) \, dx = 0$ for any f, a)