SOLUTION

CALCULUS II **QUIZ I** MATH-UA.0122-007

Write your solutions in steps.

1. (3 points) Evaluate $\int_2^5 \sqrt{x-1}\,dx$
2. (3 points) Compute $\int x\sin x\,dx$
3. (4 points) $f(x)$ is a function such that $f'(x) = x^2e^x$ and $f(0) = 3$. Find $f(1)$.

(1). $\int_2^5 \sqrt{x-1}\,dx$ $\quad (u = x-1,\ du = dx)$.

$= \int_1^4 \sqrt{u}\,du$

$= \frac{2}{3}u^{\frac{3}{2}}\Big|_1^4$

$= \frac{2}{3}\left(4^{\frac{3}{2}} - 1^{\frac{3}{2}}\right)$

$= \frac{14}{3}$

(2). $\int x\sin x\,dx = -\int x\,d\cos x$

$= -x\cos x + \int \cos x\,dx$

$= -x\cos x + \sin x + C$

(3). $f(1) - f(0) = \int_0^1 f'(x)dx = \int_0^1 x^2e^x dx$

$= \int_0^1 x^2 de^x$

$= x^2e^x\Big|_0^1 - \int_0^1 e^x dx^2$

$= e - 2\int_0^1 xe^x dx$

$= e - 2\int_0^1 x\,de^x$

$= e - 2\left(xe^x\Big|_0^1 - \int_0^1 e^x dx\right)$

$= e - 2\left(e - e^x\Big|_0^1\right)$

$= e - 2$

So $f(1) = f(0) + (e-2) = e+1$