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Math 1215: Quiz #6 **Winter 2018**

Name: SOLUTIONS	A#:	Section:

1. Compute $\int_0^1 \int_{-3}^{3} (2x^3 - y^2 e^x)\, dy\, dx$.

$$\int_{-3}^{3} (2x^3 - y^2 e^x)\, dy = 2x^3 y - \frac{1}{3} y^3 e^x \Big]_{y=-3}^{y=3}$$

$$= (6x^3 - 9e^x) - (-6x^3 + 9e^x)$$

$$= 12x^3 - 18e^x$$

(5) So $$\int_0^1 \int_{-3}^{3} (2x^3 - y^2 e^x)\, dy\, dx = \int_0^1 (12x^3 - 18e^x)\, dx$$

$$= 3x^4 - 18e^x \Big]_0^1$$

$$= (3 - 18e) - (0 - 18)$$

$$= \boxed{21 - 18e}$$

2. Compute $\int \frac{x^3}{\sqrt{1+x^4}}\, dx$

Let $u = 1 + x^4$, $du = 4x^3\, dx \Rightarrow x^3\, dx = \frac{1}{4} du$

(5) So $$\int \frac{x^3}{\sqrt{1+x^4}}\, dx = \frac{1}{4} \int \frac{du}{\sqrt{u}}$$

$$= \frac{1}{4} \cdot 2u^{1/2} + C$$

$$= \boxed{\frac{1}{2}\sqrt{1+x^4} + C}$$

v6.1