Math 2211: Recitation 1 (T)

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(1) Solve any **three** the following integrals:

(a) $\int x^2 \ln x dx$

(b) $\int \frac{1}{x^2 + 3x - 10}$

(c) $\int \sin^3(x) \cos(x) dx$

(d) $\int \frac{e^x}{49 - e^{2x}} dx$

(2) Solve the following problems. **(Do any two of them)**.

(a) Differentiate $x^5\sqrt{1 - x^2}$.

(b) Solve the differential equation $y' = e^x y + x^2 y$.

(c) Find $\frac{dy}{dx}$ of $x^2y^3 + \ln(x + 3y) - \cos(xy) = 3$.

(Bonus) Solve the following integrals. **(Do any two of them)**.

(a) Determine whether the improper integral $\int_{-\infty}^{0} e^x \sin x \, dx$ converges or diverges. If the integral converges, determine the value of the integral.

(b) Find the Taylor series at $a = \frac{\pi}{2}$ for

$$f(x) = 10 \cos x.$$

(c) Find an equation of a sphere with center $(1, -4, 3)$ and radius 5.