MA 16020 — Quiz 10 **Friday, December 5, 2025**

Name: _____ Date: _____

Instructions. Show all work with clear, logical steps. No work or hard-to-follow work will lose points. Scientific calculators are allowed. **2 points for name/date**

Problem 1. (4 points each) Evaluate the double integral

$$\int_{-1}^{2}\int_{y}^{2}(x+y)\,dx\,dy.$$

Solution.

Compute the inner integral:

$$\int_{y}^{2}(x+y)\,dx = \left[\frac{1}{2}x^2+yx\right]_{x=y}^{x=2} = \left(\frac{1}{2}\cdot 4+2y\right)-\left(\frac{1}{2}y^2+y^2\right) = 2+2y-\frac{3}{2}y^2.$$

Now integrate with respect to y:

$$\int_{-1}^{2}\left(2+2y-\frac{3}{2}y^2\right)\,dy = \left[2y+y^2-\frac{1}{2}y^3\right]_{-1}^{2}.$$

Evaluate:

$$(4+4-4)-\left(-2+1+\frac{1}{2}\right) = 4-\left(-\frac{1}{2}\right) = \frac{9}{2}.$$

$$\boxed{\frac{9}{2}}$$

Problem 2. (4 points) Set up the limits of the double integral

$$\iint_R \frac{1}{x^2+y^2}\,dA,$$

in terms of $dy\,dx$, where R is the region bounded by $y=5x$, the x-axis, and $x=2$. **Do not evaluate.**

Solution.

The region is bounded by: - below: $y=0$, - above: $y=5x$, - left: $x=0$, - right: $x=2$.

Thus the integral in the order $dy\,dx$ is

$$\boxed{\int_0^2\int_0^{5x}\frac{1}{x^2+y^2}\,dy\,dx}$$