Example 1. Evaluate \( \int_C (3 - xy^2)ds \), where \( C \) is the first quadrant of the unit circle \( x^2 + y^2 = 1 \).

Example 2. Evaluate \( \int_C 2xds \), where \( C \) is the arc \( C_1 \) of the parabola \( y = x^2 \) from \( (0, 0) \) to \( (1, 1) \) followed by the line segment \( C_2 \) from \( (1, 1) \) to \( (2, 1) \).

Example 3. Evaluate \( \int_C y^2dx - 2x dy \), where \( C \) is the line segment from \( (-4, -2) \) to \( (1, 2) \).

Example 4. Evaluate \( \int_C y^2dx \), where \( C \) is the arc of the parabola \( x = 2 - y^2 \) from \( (1, -1) \) to \( (-2, 2) \).

Example 5. Evaluate \( \int_C 2x \sin z \, ds \), where \( C \) is the helix defined by \( x = \sin t, \, y = \cos t, \, z = t \) for \( 0 \leq t \leq \pi \).

Example 6. Evaluate \( \int_C ydx + zdy + xdz \), where \( C \) is the union of the line segment \( C_1 \) from \( (3, 4, 0) \) to \( (3, 4, 5) \) and the line segment \( C_2 \) from \( (3, 4, 5) \) to \( (2, 0, 0) \).

Example 7. Find the work done by a force field \( \vec{F}(x, y) = \langle y^2, -xy \rangle \) moving a particle along the curve \( C \) given by \( \vec{r}(t) = \langle \sin t, \cos t \rangle \), when \( 0 \leq t \leq \pi/2 \).

Example 8. Evaluate \( \int_C \vec{F} \cdot d\vec{r} \), where \( \vec{F}(x, y, z) = \langle xy, yz, zx \rangle \) and \( C \) is given by \( x = t, \, y = t^2, \, z = t^3 \) for \( 0 \leq t \leq 1 \).