Evaluate the line integral, where C is the given curve.

1) $\int_C y\,ds$, $C:\ x = t^2,\ y = t,\ 0 \le t \le 2$

2) $\int_C xy^4\,ds$, C is the right half of the circle $x^2 + y^2 = 16$.

3) $\int_C xe^{yz}\,ds$, C is the line segment from $(0,\ 0,\ 0)$ to $(1,\ 2,\ 3)$.

4) $\int_C xy\ dx + (x-y)\ dy$, C consist of the line segments from $(0,\ 0)$ to $(2,\ 0)$ and from $(2,\ 0)$ to $(3,\ 2)$.

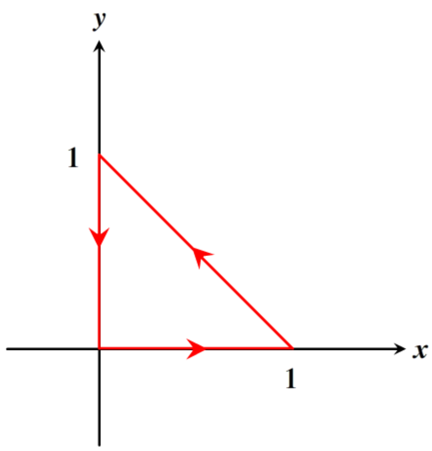
5) $\int_C x^2\ dx + y^2\ dy + z^2\ dz$, C consist of the line segments from $(0,\ 0,\ 0)$ to $(1,\ 2,\ -1)$ and from $(1,\ 2,\ -1)$ to $(3,\ 2,\ 0)$.

Evaluate the line integral $\int_C \vec{\mathbf{F}} \cdot d\vec{\mathbf{r}}$, where C is given by the vector function $\vec{\mathbf{r}}(t)$.

6) $\vec{\mathbf{F}}(x,\ y) = x^2 y^3\,\mathbf{i} - y\sqrt{x}\,\mathbf{j}$, $\quad \vec{\mathbf{r}}(t) = t^2\,\mathbf{i} - t^3\,\mathbf{j}, \quad 0 \le t \le 1$

7) $\vec{\mathbf{F}}(x, y, z) = z\,\mathbf{i} + y\,\mathbf{j} - x\,\mathbf{k}$, $\vec{\mathbf{r}}(t) = t\,\mathbf{i} + \sin t\,\mathbf{j} + \cos t\,\mathbf{k}$, $0 \le t \le \pi$

8) Find the work done by the force field $\vec{\mathbf{F}}(x, y) = x\,\mathbf{i} + y\,\mathbf{j}$ on a particle that moves along the path shown below.



9) Find the work done by the force field $\vec{\mathbf{F}}(x, y) = \left\langle x^2 + y,\ 2xy \right\rangle$ on a particle that moves along the circle centered at the origin with radius 2 oriented counterclockwise beginning at $(2, 0)$ and completing one cycle around the circle.