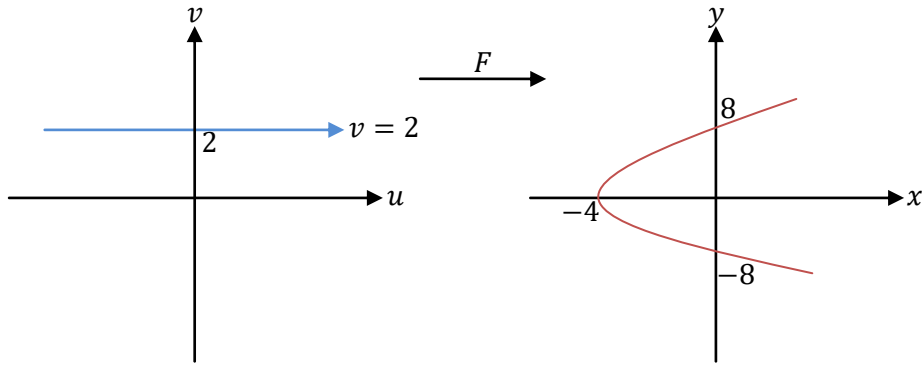


II.Ödev Cevap Anahtarı

1. $d\theta = d(x^2y) \wedge dx + d(xyz) \wedge dy + d(xz^2) \wedge dz$
 $= (2xydx + x^2dy) \wedge dx + (yzdx + xzdy + xydz) \wedge dy + (z^2dx + 2xzdz) \wedge dz$
 $= -x^2dx \wedge dy + yzdx \wedge dy - xydy \wedge dz + z^2dx \wedge dz$
 $= (yz - x^2)dx \wedge dy + z^2dx \wedge dz - xydy \wedge dz$
 $d(d\theta) = d(yz - x^2) \wedge dx \wedge dy + d(z^2) \wedge dx \wedge dz - d(xy) \wedge dy \wedge dz$
 $= (-2xdx + zdy + ydz) \wedge dx \wedge dy + 2zdz \wedge dx \wedge dz - (ydx + xdy) \wedge dy \wedge dz$
 $= ydx \wedge dy \wedge dz - ydx \wedge dy \wedge dz = 0$
2. $F: \mathbb{R}^2 \rightarrow \mathbb{R}^2, F(u, v) = (u^2 - v^2, 2uv)$
 a) $F(u, 2) = (u^2 - 4, 4u) \Rightarrow x = u^2 - 4, y = 4u \Rightarrow x = u^2 - 4, u = \frac{y}{4}$
 $\Rightarrow x = \frac{y^2}{16} - 4$ (parabol)



- b) $u^2 + v^2 = 1, v \geq 0$ yarım çemberi aşağıdaki şekilde parametrelendirilebilir,
 $u = \cos t, v = \sin t, 0 \leq t \leq \pi \Rightarrow \alpha(t) = (\cos t, \sin t), 0 \leq t \leq \pi$ olmak üzere,
 $F(\alpha(t)) = F(\cos t, \sin t) = (\cos^2 t - \sin^2 t, 2\cos t \sin t) = (\cos 2t, \sin 2t), 0 \leq t \leq \pi$ (1 yarıçaplı tam çember).

