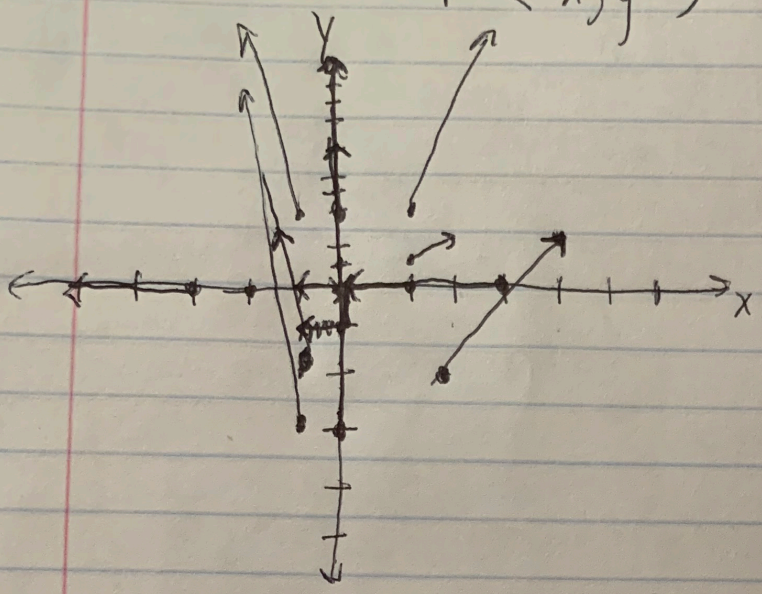
q17 Rahul Paleja

Section: 22

① Sketch The Vector Planar Vector Field

$F = \langle x, y^2 \rangle$



Shape of Parabola

(x,y)	F(x,y)
(1,0)	⟨1,0⟩
(0,1)	⟨0,1⟩
(-1,0)	⟨-1,0⟩
(0,-1)	⟨0,1⟩
(3,0)	⟨3,0⟩
(0,3)	⟨0,9⟩
(-3,0)	⟨-3,0⟩
(0,-3)	⟨0,9⟩
(2,-2)	⟨2,4⟩
(1,1)	⟨1,1⟩
(1,3)	⟨1,9⟩
(-1,3)	⟨-1,9⟩
(-1,-2)	⟨-1,4⟩
(-1,-3)	⟨-1,9⟩

② Find a potential function for vector field F:

$F = \langle y\cos(xy), x\cos(xy) \rangle$

$F_x = y\cos(xy)$

$F = \int y\cos(xy)\,dx$ $\quad u = xy$, $du = y\,dx$

$\int \cos(u)\,du = \sin(xy) + g(y)$

$F_y = x\cos(xy) + g_y = x\cos(xy)$ so $g(y) = 0$

Thus:

$F = \sin(xy)$