* Fluid Kinematics problem:

For a 2D velocity field of an incompressible fluid where:

$V_x = \frac{3}{2} t y^2 x$ and $V_y = a y^3 t$

[A] evaluate:

1- the value of a that makes the flow field satisfy the continuity equation.

2- the magnitude of the velocity and the stream function at $t = 2$.

3- the total acceleration vector.

[B] Is the flow steady?

[C] Is the flow rotational?