FLUID MECHANICS LAWS SUMMARY

LAW / PRINCIPLE	GOVERNING EQUATION	KEY CONCEPT
Pascal's Law	$\hat{I}''P = \ddot{I}\square g(\hat{I}''h)$	Pressure applied to an enclosed fluid is transmitted undiminished to every portion of the fluid and to the walls of the container.
Archimedes' Principle	$F_b = \dot{I}\square_f V_{displaced}\, g$	The upward buoyant force exerted on a body immersed in a fluid is equal to the weight of the fluid that the body displaces.
Continuity Equation	$A_1v_1 = A_2v_2$	Conservation of mass in steady flow: the product of cross-sectional area and velocity remains constant for an incompressible fluid.
Bernoulli's Principle	$P + \hat{A}½\ddot{I}\square v\hat{A}^2 + \ddot{I}\square gh = constant$	Conservation of energy for flowing fluids: an increase in the speed of a fluid occurs simultaneously with a decrease in pressure.

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Poiseuille's Law	$Q = (Ï€râ´Î”P) / (8Î·L)$	Describes the volumetric flow rate of a viscous liquid through a cylindrical pipe in laminar flow.
Stokes' Law	$F_d = 6Ï€Î¼rv$	Calculates the drag force exerted on spherical objects moving through a viscous fluid at low Reynolds numbers.
Reynolds Number	$Re = (ÏvL) / Î¼$	A dimensionless quantity used to help predict flow patterns (laminar vs. turbulent) by comparing inertial and viscous forces.