1. $\dfrac{\partial w}{\partial x} + a\left(\dfrac{\partial w}{\partial y}\right)^2 = by.$

This equation governs the free vertical drop of a point body near the Earth's surface (y is the vertical coordinate measured downward, x time, $m = 1/(2a)$ the mass of the body, and $g = 2ab$ the gravitational acceleration).

Complete integral:

$$w = -C_1 x \pm \frac{2a}{3b}\left(\frac{by + C_1}{a}\right)^{3/2} + C_2,$$

where C_1 and C_2 are arbitrary constants.

References

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