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Assignment 1

$$F_D = \frac{0.3V^2}{500 + (\ln V)^3} - 0.02$$

$$m = 3.5 \text{ kg} \quad g = 9.8 \text{ m/s}^2$$

$$F_D = m \cdot g \\ = 3.5 \times 9.8 = 34.3$$

$$F(V) = \frac{0.3V^2}{500 + (\ln V)^3} - 0.02V - 34.3$$

$$0 = \frac{0.3V^2}{500 + (\ln V)^3} - 0.02V - 34.3$$

$$34.3 + 0.02V = \frac{0.3V^2}{500 + (\ln V)^3}$$

$$(34.3 + 0.02V)(500 + (\ln V)^3) = 0.3V^2$$

$$17150 + 34.3(\ln V)^3 + 10V + 0.02V(\ln V)^3 = 0.3V^2$$

$$V^2 = \frac{17150 + 10V + (34.3 + 0.02V)(\ln V)^3}{0.3}$$

$$V = \sqrt{57166.67 + 33.33V + (114.33 + 0.067)(\ln V)^3}$$