

Formulas for Math 150
Applications of Integrals
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Average Value: $\frac{1}{b-a} \int_a^b f(x) dx$

Future Value: $P = P_0 e^{kt}$

Present Value: $P_0 = P e^{-kt}$

Accumulated Future value: $FV = \int_0^T R(t) e^{kt} dt$

Consumers Surplus: $CS = \int_0^Q D(x) dx - QP$ or $\int_0^{x_E} (D(x) - P_E) dx$

Producer's Surplus: $PS = QP - \int_0^Q S(x) dx$ or $\int_0^{x_E} (P_E - S(x)) dx$

Gini Index or Gini Coefficient: $2 \cdot \int_0^1 (x - L(x)) dx$

Accumulated Present Value: $PV = \int_0^T R(t) e^{-kt} dt$

Capital Value (or perpetual present value):

$$CV = \int_0^{\infty} f(t) e^{-rt} dt \quad \text{or} \quad \int_0^{\infty} P e^{-kt} dt = \frac{P}{k}$$