Cheatsheet: *b, c,* and *n* are constants; *u* and *v* are functions of *x* . In the interest problems:
P = principal, *r* = annual interest rate, *n* = # of times compounded per year, *t* = years, *A* = amount.

$$\frac{d(\ln x)}{dx} = \frac{1}{x} \qquad \frac{d(\log_b x)}{dx} = \frac{1}{x \ln b}$$

$$\frac{d(x^n)}{dx} = nx^{n-1} \qquad \frac{de^x}{dx} = e^x$$

$$\frac{d(b^x)}{dx} = b^x \ln b \qquad \frac{d(uv)}{dx} = u'v + uv'$$

$$\frac{d\left(\frac{u}{v}\right)}{dx} = \frac{u'v - uv'}{v^2} \qquad \frac{d(u(v(x)))}{dx} = \frac{du}{dv} \cdot \frac{dv}{dx}$$

$$\int \frac{1}{x} dx = \ln|x| + c \qquad \int e^{kx} dx = \frac{1}{k} e^{kx} + c$$

$$\int x^n dx = \frac{x^{n+1}}{n+1} + c \qquad \int bv(x)dx = b\int v(x)dx$$

$$when \quad ax^2 + bx + c = 0 \qquad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$interest\ compounded\ continuously: \quad A = Pe^{rt}$$

$$relative\ rate\ of\ change: \quad \frac{u'}{u}$$

$$elasticity\ of\ demand:$$

$$E = -\frac{relative\ rate\ of\ change\ in\ quantity}{relative\ rate\ of\ change\ in\ price} = \frac{-p}{q}\frac{1}{p'}$$

$$compound\ interest: \quad A = P(1 + \tfrac{r}{n})^{nt}$$