The following formulas will be given to you on the midterm.

- **Product rule:** If $F(x) = f(x)g(x)$ then
$$F'(x) = f'(x)g(x) + f(x)g'(x).$$

- **Quotient rule:** If $F(x) = \frac{f(x)}{g(x)}$ then
$$F'(x) = \frac{f'(x)g(x) - f(x)g'(x)}{g(x)^2}.$$

- **Chain rule:** If $F(x) = f(g(x))$ then
$$F'(x) = f'(g(x))g'(x).$$

- **Power rule:** If $F(x) = f(x)^n$ then
$$F'(x) = nf(x)^{n-1}f'(x).$$

- **Quadratic formula:** If $ax^2 + bx + c = 0$ then
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$

- **Integrals:**
$$\int f'(x)f(x)^n dx = \frac{f(x)^{n+1}}{n+1} + C \text{ if } n \neq -1;$$
$$\int f'(x)f(x)^{-1} dx = \ln|f(x)| + C;$$
$$\int f'(x)e^{f(x)} dx = e^{f(x)} + C.$$

- **Elasticity:** If x is the quantity and p is the price then the elasticity is
$$-\frac{p}{x}\frac{dx}{dp}.$$