Name:

Student Number:

Cheat Sheet for Part I: The Optimizing Individual

- The space provided below each question should be sufficient for your answer. If you need additional space, ask for additional paper.
- You are allowed to use a calculator, but only the basic functions. Use of advanced formulas (e.g., if your calculator does present value) or of material that you have programmed into your calculator is not allowed and will be considered cheating.
- You are encouraged to show your work for partial credit. It is very difficult to give partial credit if the only thing on your page is "$x = 3$".
- **Expected value** is given by summing likelihood times value over all possible outcomes:

$$\text{Expected Value} \quad = \sum_{\text{Outcomes } i} \text{Probability}(i) \cdot \text{Value}(i).$$

- A **fair bet** is a bet with an expected value of zero.
- The **future value of a lump sum payment** of $\$x$ invested for n years at interest rate r is $\text{FV} = x(1+r)^n$. The **present value of a lump sum payment** of $\$x$ after n years at interest rate r is $\text{PV} = \dfrac{x}{(1+r)^n}$.
- The present value of an **annuity** paying $\$x$ at the end of each year for n year at interest rate r is

$$\text{PV} = x \left[\frac{1 - \dfrac{1}{(1+r)^n}}{r} \right].$$

  The present value of the related **perpetuity** (with annual payments forever) is

$$\text{PV} = \frac{x}{r}.$$

- The **inflation rate**, i, is the rate at which prices rise. The **nominal interest rate**, n, is the interest rate in terms of dollars. The **real interest rate**, r, is the interest rate in terms of purchasing power. These are related by

$$1 + r = \frac{1+n}{1+i}.$$

  When the inflation rate is small, we can approximate this as

$$r \approx n - i.$$