Maximizing utility in the context of labor supply is IDENTICAL to what you've been doing thus far, just with a different budget constraint. Apropos, let's see how the budget constraint for labor supply is derived. Understand and you won't need to memorize.

Budget Constraint

You might see different variables used, but here are the ones I like. Let

$$T = \text{ Total Hours, } L_e = \text{ Hours of Leisure, } L_a = \text{ Hours of Labor, } C = \text{ Consumption,}$$
$$p = \text{ Price of Consumption, } Y = \text{ Total Income, } Y_n = \text{ Non-wage Income, } w = \text{ Hourly Wage Rate.}$$

You may be asking, "what's the difference between consumption and income?". Think of consumption as real income and income as nominal income. Recall that real income is our purchasing power, i.e. how many units of stuff we can buy. So

$$C = \frac{Y}{p}.$$

However, don't stress this too much. In this class, we ALWAYS set $p = 1$, so consumption always equals income.

To get the budget constraint, we need two relatively straight-forward equations:

$$T = L_e + L_a \text{ (Why?)}$$

and

$$Y = Y_n + wL_a \iff \text{Total Income} = \text{ Non-wage income + wage income.}$$

Then

$$Y = Y_n + wL_a = Y_n + w(T - L_e).$$

Rearranging terms, we have that

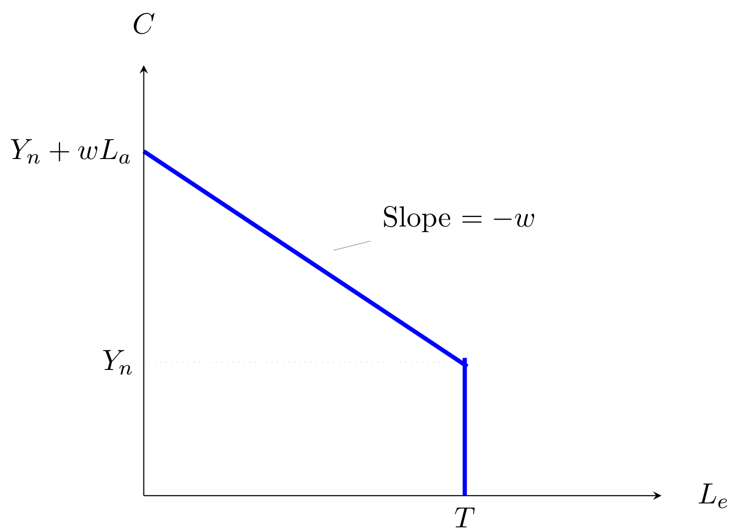
$$Y + wL_e = Y_n + wT \quad \Longleftarrow \text{ BUDGET CONSTRAINT EQUATION}$$

Technically, it should be

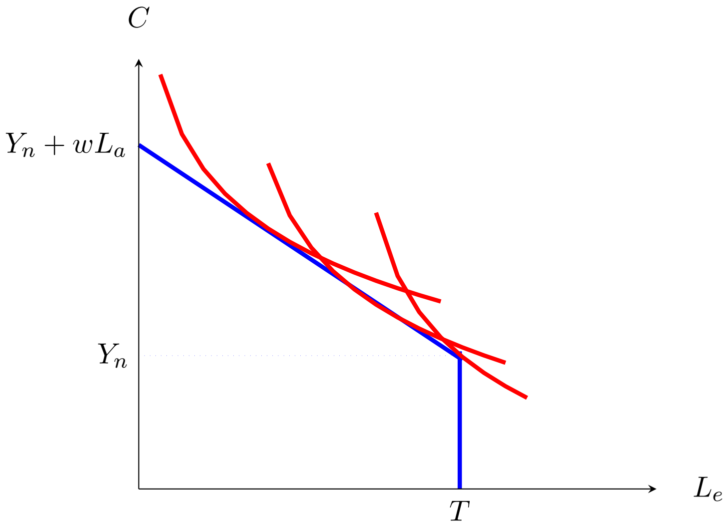
$$pC + wL_e = Y_n + wT,$$

but at $p = 1$ consumption equals total income.

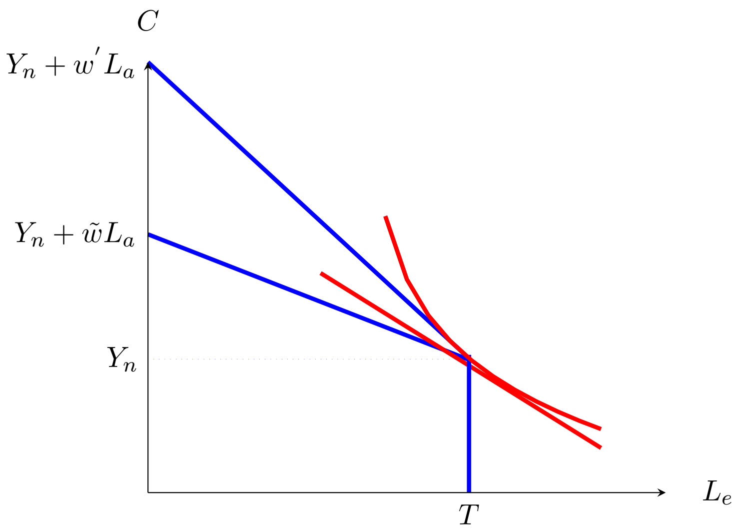
Graphically,



Adding a few indifference curves,



Definition: - <u>Reservation Wage</u> The wage at which you are indifferent between beginning to work, i.e. from $L_a = 0$ to $L_a = 1$, and not. The reservation wage is represented by the slope of the indifference curve at the kink point:



The straight red line is the slope of the indifference curve, i.e. the MRS, at the point (T, Y_n). In this context, we can interpret the MRS as "if we give up an hour of leisure, how much consumption/income do we need to be just as happy?". The reservation wage is thus the wage w_R such that $|\text{MRS}| = w_R$ at the point (T, Y_n).

For low wages $\tilde{w}$, you will not begin working since $|\text{MRS}| > \tilde{w}$ at (T, Y_n), and for high wages $w^{'}$, you will begin working since $|\text{MRS}| < w^{'}$ at (T, Y_n).

Practice Problems

To solve these problems, do the same thing you've been doing the entire course, just use the labor supply budget constraint. I've left #3c as a challenge problem. Gold star to whomever solves it :)

1. Interpret MRS in the context of Labor Supply (in general, not just at point (T, Y_n))
2. $u(L_e, Y) = 120\sqrt{L_e} + Y,\ T = 16,\ w = 20,\ Y_n = 0$. Find $L_e^*,\ L_a^*,\ Y^*$
3. $u(L_e, Y) = 20Le + Y,\ T = 16,\ w = 10,\ Y_n = 0$. Find $L_e^*,\ L_a^*,\ Y^*$ (think about the reservation wage. Draw it out if you're stuck)
4. $u(L_e, Y) = L_eY,\ w = 20,\ T = 10,\ Y_n = 0$
   (a) Find L_a^* at $w = 20$
   (b) Find L_a^* at $w = 5$
   (c) Find the SE for L_a resulting from the change in wage