ECON 321, Assignment 10:
BP, Chapter 7.2.1: Switching Costs

1. First, review our Hotelling model from Assignment 10, and note that for the case of $\tau = 1$, the equilibrium outcome would be $p = 2$, $q = \frac{1}{2}$ for both firms, and $\pi^{op} = \frac{1}{2}$ for both firms.

2. Read the intro to 7.2 and section 7.2.1, noting case 7.2 which explains all the various types of switching costs. We're going to model "Scenario 1: Old customers inherit their type from period 1." Refer back to your Hotelling assignment 10 because this is basically the same.

3. Note that in this model we have firms A and B, and stages 1 and 2. This can get confusing, and subscripts like this can confuse Mathematica. To make things clear, I started by setting up the utilities from buying the two goods as follows

```
vA2 = r - x - pA2, vB2 = r - (1 - x) - pB2
```

Then set them equal, and then go from there. As you go along, note that it's much easier just to put $(1-\lambda_n)$ in for λ_0 in the `qA2` and `qB2` functions.

4. Once you've replicated the results for the stage 2 prices, quantities, and profits, substitute in the special case of $\alpha_A = \alpha_B = \frac{1}{2}$ and $c = 1$. Plot how the equilibrium price changes as a function of λ_n.

5. Read down to where they derive $\hat{x}$ for period 1. You can do this two, just set up `vA1` and `vB1` and solve for the consumer x who is indifferent.

6. You can stop there if you want, or for extra credit you can continue. The book does some changes of notation, introducing a Z function. But with Mathematica, it's easier just to brute force things, setting up the period 1 profit functions (including the period 2 profits which will proceed according to the stage 2 outcome), and then maximizing.