Lecture #23 10/24/2016

Ex1: Bob wants to buy new Tissot watches. There are two stores selling the model he likes. The price in the 1st store is 400\$ and he needs to pay 7% of State taxes. The other store has the same model for 410\$, but Bob has a 4%-off coupon, while the State taxes are the same.

Where shall he buy this model of Tissot and how much will it cost Bob?

► 1st Shop: $400\$ + 0.07 \cdot 400\$ = 1.07 \cdot 400\$ = 428\$$

2nd Shop: $410\$ - 0.04 \cdot 410\$ = 0.96 \cdot 410\$$ – the price without taxes

$1.07 \cdot 0.96 \cdot 410\$ \approx \underline{\underline{421.15}}\$$ ← the price he will pay in the 2nd store.

Answer: Bob will spend less when buying in the 2nd store, where he will end up by paying 421\$ & 15¢ ∎

Ex2: The inflation rate in 2015 was 2%. Use this rate to find what salary at the end of 2014 would be equivalent to a \$60,000 salary at the end of 2015.

► All we need to do is to compute

$$\frac{\$60,000}{1.02} = \underline{\underline{58,823^{53}\$}}$$

$$1 + \frac{2\%}{100\%} \rightarrow 1.02$$ ∎

Ex3 (Exercise 10.1.15) A shoe store marks up the price of its shoes at 120% over cost. A pair of shoes goes on sale for 20% off, then goes on the clearance rack for an additional 30% off. A customer walks in with a 10% off coupon and buys the shoes. Express the store's profit on these shoes as a percentage of the original cost.

► $(1+1.2)\cdot(1-0.2)\cdot(1-0.3)\cdot(1-0.1) = 1 + 0.1088 \Rightarrow$ profit is $\underline{10.88\%}$ ∎

Lecture #23 10/21/2016

Rmk: Point out the relation b/w the growth rate from last lecture and the percentage increase / decrease in values in the current topic.

Warnings: (1) If your stock portfolio goes up 25% one day and goes down 20% next day, then you do not make 5% over these two days. Instead, you get what you started from since $(1+0.25)\cdot(1-0.2)=1$.

(2) Sometimes stores advertise discount of >100% (see Ex 10.6). Mathematically they are wrong!

- Simple Interest

Initial data & terminology:

- Principal (P) – the sum of \$ that Lender (L) lends to Borrower (B)
- Interest rate (r) – the rate paid by B to L for using P over a particular period of time, e.g. a year

In the case when interest rate is expressed as % of P over a year, then the rate is called APR.

- Term (t) – the length of time the B is borrowing money.
- Repayment Schedule
  - single payment: paying off the loan in a lump sum @ end
  - installment loan: repays making equal monthly payments
- Interest
  - single: the interest rate is applied only to P
  - compound: the interest accumulates

Simple Interest Formula: $\boxed{I = t\cdot r\cdot P}$ or Future payoff $\boxed{F = P\cdot(1+t\cdot r)}$

! Ex. 10.9 on bonds.