

If a question asks “why/explain”, you should give a full explanation that would convince a skeptic.

Name: \_\_\_\_\_  
(also write your name on the back)

## **Finance 325: Quiz #1 - Solutions**

September 16, 2010

1. What is the “Rule of 72” and how is it used? Use an example in your answer. (3 pts)

**The Rule of 72 approximates how long it takes for an investment to double in value at a given interest rate. The equation is:**

$$\text{\# of years to double} \cong \frac{72}{\text{rate (in \%)}}$$

**For example, at 8%, it would take  $72/8 =$  approximately 9 years for an investment to double in value. If we invest \$100 for 9 years at 8%, we get:**

$$FV = 100(1 + 0.08)^9 = 199.90$$

2. You are going to fund a new faculty position at the WSU Business School. The school tells you that they will want to use your gift to hire another finance faculty position in a few years. This position will be filled 4 years from today, and the salary upon hiring will be \$125,000 per year (assume that the first year’s salary is paid immediately upon filling the position). The salary will then increase every year by 4% APR, compounded annually. They expect to always have this position filled in the future. If your discount rate is 9% APR, compounded monthly, what is the amount that you need to give WSU today in order to fund this new position? (4 pts)

Today	1 yr	2	3	4	5	...
				125,000	125,000(1.04)	...

**This is a growing perpetuity, so we need the growing perpetuity formula. Since we have annual CFs, we need the annual discount rate and annual inflation. We are given the annual inflation, but need to calculate the EAR of the discount rate:**

$$EAR = \left(1 + \frac{0.09}{12}\right)^{12} - 1 = 9.38\%$$

**The PV of the perpetuity (in year 3) is:**

$$PV = \frac{125,000}{0.0938 - 0.04} = 2,323,420$$

**The PV today is:**

$$PV = \frac{2,323,420}{(1 + 0.0938)^3} = \$1,775,473$$

3. You have been presented with two investment opportunities:
- Nominal 8.5% APR, compounded annually
  - Real 5.4% APR, compounded annually

If inflation is 3% APR, compounded annually, then which is the better option? (3 pts)

**In order to compare the two interest rates, we need to convert both into either real rates or nominal rates (either approach will give the correct solution). This solution will show the comparison of nominal rates, but you would earn full credit by solving for the real rates, too.**

**The nominal rate of the first option is 8.5%. The nominal rate of the second option is:**

$$1 + \textit{nominal} = (1 + \textit{real})(1 + \textit{inflation})$$

$$1 + \textit{nominal} = (1 + 0.054)(1 + 0.03) = 1.08562$$

$$\textit{nominal} = 8.562\%$$

**Thus, option (b) has a higher rate and you would choose that option.**