FI 410   **Dr. Anup Agrawal**
Intermediate Financial Management

Quiz 1 (Practice)

Instructions: Answer all three questions. Show all work. If you use financial functions in your calculator, show all inputs. There is partial credit for method.

1. RainMan Inc. is in the business of producing rain upon request. The company is deciding between two alternative technologies: a new airplane for seeding rain clouds or a new weather control machine built by Dr. Nutzbaum. The discount rate for the new airplane is 9%, while the discount rate for the weather machine is 39% (it has higher risk). Which investment should the company select and why?

(40 points)

Year	Airplane	Weather Machine
0	-900	-900
1	500	550
2	600	600
3		685

2. The market value of Charcoal Corporation's common stock is $20 million, and the market value of its risk-free debt is $5 million. The beta of the company's common stock is 1.25, and the market risk premium is 8%. The Treasury bill rate is 5% and there are no taxes. Calculate:

a. The cost of equity?   (20 points)

b. The company's cost of capital?   (20 points)

3. Music Company is considering investing in a new project. The project will need an initial investment of $2.4 million and will generate $1.2 million in annual after-tax cash flows over the next three years. Is this a good investment if the cost of capital is 15%? Why or why not?

(20 points)

FORMULAE

1. Equivalent annual cashflow, $EAC = NPV / PVA_{T,k}$

   where $PVA_{T,k} = PV$ of an annuity of \$1 per year for T years at a discount rate k.

2. CAPM: $E_i = r_f + \beta_i (E_m - r_f)$,

   where E_i = Expected return on asset i

                 E_m = Expected return on the market portfolio

                 r_f = the riskfree rate

                 β_i = the systematic risk of asset i

3. $\beta_{asset} = (D/V)\, \beta_{debt} + (E/V)\, \beta_{equity}$

   where V = market value of the firm = D + E

                 D = market value of debt

                 E = market value of equity

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1. Airplane : $NPV = -900 + \dfrac{500}{1.09} + \dfrac{600}{1.09^2} = \$63.72$

   $EAC = \dfrac{NPV}{PVA_{2,9\%}} = \dfrac{63.72}{2 \to 1.7591} = \$24.5 + \$36.22$

   Weather m/c :

   $NPV = -900 + \dfrac{550}{1.39} + \dfrac{600}{1.39^2} + \dfrac{685}{1.39^3} = \$61.29$

   $EAC = \dfrac{61.29}{PVA_{3,39\%}} = \dfrac{61.29}{1.6093} = \$38.08$

   $\therefore$ Pick the weather m/c, $\because$ higher EAC.

2. a. $k_{Eq} = r_f + \beta_{Eq} (E_m - r_f) = 5 + 1.25 (8) = 15\%.$

   b. $k_{Co.} = \dfrac{D}{V} k_D + \dfrac{E}{V} k_E = \dfrac{5}{20+5} (5) + \dfrac{20}{25} (15) = 1 + 12 = 13\%.$

3. $NPV = -2.4 + 1.2 \, PVA_{3,15\%} = \$0.34 \text{ million}$
   $\qquad\qquad\qquad \hookrightarrow 2.2832$