

ECO352 - Review questions for Final exam

1. The swift company is planning to finance an expansion. The principal executives of the company agree that an industrial company such as theirs should finance growth by issuing common stock rather than by taking on additional debt. Because they believe that the current price of swift's common stock does not reflect its true worth, however, they have decided to sell convertible bonds. Each convertible bond has a face value equal to \$1,000 and can be converted into 25 shares of common stock. what would be the minimum price of the stock that would make it beneficial for bondholders to convert their bonds? Ignore the effects of taxes or other costs.

answer)

The conversion price simply is the face (par) value of the bond divided by the conversion ratio—the conversion price for this issue is $\$1,000/25 = \40 . Therefore, it would be beneficial for investors to convert their bonds into common stock when the price of the stock is greater than \$40 per share.

2. Suppose you own a call option that permits you to purchase 100 shares of the stock of Silicon Graphics for \$15 per share any time during the next three months. Silicon Graphics has a current market price of \$12 per share.

a. Should you exercise the option and purchase the stock if the price increases to \$18? What would be your gain (loss) if you exercised the option and then immediately sold the stock?

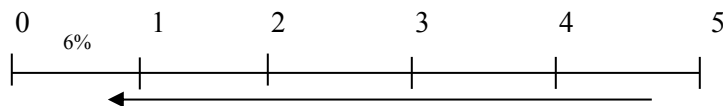
answer) If $P_0 = \$18$, the option is exercised, and the stock is sold immediately, the gain would be $(\$18 - \$15) \times 100 = \$300$. Therefore, it would be beneficial to exercise the option.

b. Should you exercise the option and purchase the stock if the price increases to \$13? What would be your gain (loss) if you exercised the option and then immediately sold the stock?

answer) If $P_0 = \$13$, the option is exercised, and the stock is sold immediately, the loss would be $(\$13 - \$15) \times 100 = -\$200$. Therefore, it would not be beneficial to exercise the option.

3. What is the present value of an investment that promises to pay you \$1,000 in five years if you can earn 6 percent interest compounded annually?

answer)



PV = ?

$$PV = 1,000 \left[\frac{1}{(1.06)^5} \right] = 1,000(0.74726) = 747.26$$

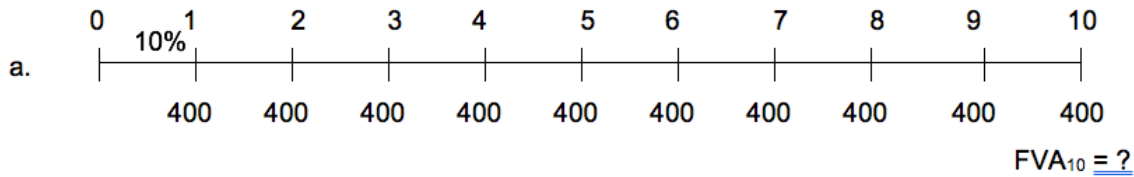
Using a financial calculator, enter $N = 5$, $I/Y = 6$, and $FV = 1,000$; compute $PV = -747.26$

4. Find the future value of the following ordinary annuities:

- a. \$400 per year for 10 years at 10 percent
 b. \$200 per year for five years at 5 percent
 answer)

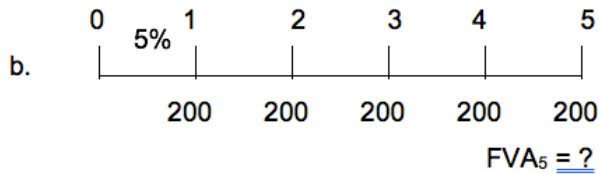
The general formula for computing the future value of an ordinary annuity is:

$$FVA_n = PMT \left[\frac{(1+r)^n - 1}{r} \right]$$



$$FVA_{10} = 400 \left[\frac{(1.10)^{10} - 1}{0.10} \right] = 400(15.93742) = 6,374.97$$

Using a financial calculator, enter N = 10, I/Y = 10, and PMT = -400; compute FV = 6,374.97



$$FVA_5 = 200 \left[\frac{(1.05)^5 - 1}{0.05} \right] = 200(5.52563) = 1,105.13$$

Using a financial calculator, enter N = 5, I/Y = 5, and PMT = -200; compute FV = 1,105.13

5. Find the future value of the following annuities due:

- a. \$400 per year for 10 years at 10 percent

answer)

$$FVA(DUE)_n = PMT \left\{ \left[\frac{(1+r)^n - 1}{r} \right] \times (1+r) \right\}$$

$$FVA(DUE)_{10} = 400 \left\{ \left[\frac{(1.10)^{10} - 1}{0.10} \right] \times (1.10) \right\} = 400(17.53117) = 7,012.47$$

- b. \$200 per year for five years at 5 percent

$$FVA(DUE)_5 = 200 \left\{ \left[\frac{(1.05)^5 - 1}{0.05} \right] \times (1.05) \right\} = 200(5.80191) = 1,160.38$$

6. Find the present value of the following ordinary annuities:

a. \$400 per year for 10 years at 10 percent

answer)

$$PVA_n = PMT \left[\frac{1 - (1+r)^{-n}}{r} \right]$$

$$PVA_{10} = 400 \left[\frac{1 - \frac{1}{(1.10)^{10}}}{0.10} \right] = 400(6.14457) = 2,457.83$$

b. \$200 per year for five years at 5 percent

answer)

$$PVA_5 = 200 \left[\frac{1 - \frac{1}{(1.05)^5}}{0.05} \right] = 200(4.32948) = 865.90$$

7. Find the present value of the following annuities due:

a. \$400 per year for 10 years at 10 percent

answer)

$$PVA(DUE)_n = PMT \left\{ \left[\frac{1 - \frac{1}{(1+r)^n}}{r} \right] \times (1+r) \right\}$$

$$PVA(DUE)_{10} = 400 \left\{ \left[\frac{1 - \frac{1}{(1.10)^{10}}}{0.10} \right] \times (1.10) \right\} = 400(6.75902) = 2,703.61$$

b. \$200 per year for five years at 5 percent

answer)

$$PVA(DUE)_5 = 200 \left\{ \left[\frac{1 - \frac{1}{(1.05)^5}}{0.05} \right] \times (1.05) \right\} = 200(4.54595) = 909.19$$

8. Find the present values of the following cash flow streams under the following conditions:

Year	Cash stream A	Cash stream B
1	\$100	\$300
2	400	400
3	400	400
4	300	100

a. The appropriate interest rate is 8 percent
answer)

$$PV_A = 100 \left[\frac{1}{(1.08)^1} \right] + 400 \left[\frac{1}{(1.08)^2} \right] + 400 \left[\frac{1}{(1.08)^3} \right] + 300 \left[\frac{1}{(1.08)^4} \right]$$

$$= 92.5926 + 342.9355 + 317.5329 + 220.5090 = 973.57$$

$$PV_B = 300 \left[\frac{1}{(1.08)^1} \right] + 400 \left[\frac{1}{(1.08)^2} \right] + 400 \left[\frac{1}{(1.08)^3} \right] + 100 \left[\frac{1}{(1.08)^4} \right]$$

$$= 277.7778 + 342.9355 + 317.5329 + 73.5030 = 1,011.75$$

b. The appropriate interest rate is 0 percent

$$PV_A = \$100 + \$400 + \$400 + \$400 + \$300 = \$1,200.$$

$$PV_B = \$300 + \$400 + \$400 + \$400 + \$100 = \$1,200.$$

9. Find the future values of the following ordinary annuities:

a. FV of \$400 each six month for five years at a simple rate of 12 percent, compounded semiannually
answer)

$$FVA_n = PMT \left[\frac{(1 + \frac{r}{m})^n - 1}{(\frac{r}{m})} \right] = 400 \left[\frac{(1.06)^{10} - 1}{0.06} \right] = 400(13.18079) = 5,272.32$$

b. FV of \$200 each six month for five years at a simple rate of 12 percent, compounded quarterly
answer)

$$FVA_n = 200 \left[\frac{(1.03)^{20} - 1}{0.03} \right] = 200(26.87037) = 5,374.07$$

10. find the present values of the following ordinary annuities:

a. PV of \$400 each six month for five years at a simple rate of 12 percent, compounded semiannually
answer)

$$PVA_n = PMT \left[\frac{1 - \left(1 + \frac{r}{m}\right)^n}{\left(\frac{r}{m}\right)} \right] = 400 \left[\frac{1 - (1.06)^{-10}}{0.06} \right] = 400(7.36009) = 2,944.03$$

b. PV of \$200 each six month for five years at a simple rate of 12 percent, compounded quarterly

answer)

PVA_n

$$FVA_n = 200 \left[\frac{1 - (1.03)^{-20}}{0.03} \right] = 200(14.87747) = 2,975.49$$

11. Buner corp.'s outstanding bond has the following characteristics:

Years to maturity: 6

Coupon rate of interest: 8%

Face value: \$1,000

If investors require a rate of return equal to 12 percent on similar risk bonds and interest is paid semiannually, what should be the market price of Buner's bond?

answer)

Calculator solution: Input N = 12, I/Y = 6, PMT = 40, and FV = 1,000, compute PV = -832.32.

$$V_d = 40 \left[\frac{1 - \frac{1}{(1.06)^{12}}}{0.06} \right] + 1,000 \left[\frac{1}{(1.06)^{12}} \right]$$

$$= 40(8.38384) + 1,000(0.49697) = 335.3538 + 496.97 = 832.32$$

12. Rick bought a bond when it was issued by Macroflex corporation 14 years ago. The bond, which has a \$1,000 face value and a coupon rate equal to 10 percent, matures in six years from today. Interest is paid every six months; the next interest payment is scheduled for six months from today. what is the current market value (price) of the bond?

answer)

Calculator solution: Input N = 12, I/Y = 7, PMT = 50, and FV = 1,000, compute PV = -841.15.

$$V_d = 50 \left[\frac{1 - \frac{1}{(1.07)^{12}}}{0.07} \right] + 1,000 \left[\frac{1}{(1.07)^{12}} \right]$$

$$= 50(7.94269) + 1,000(0.444012) = 397.1345 + 444.012 = 841.15$$

13. Suppose Ford Motor company sold an issue of bonds with a 10 year maturity, a 1,000 par value, a 10 percent coupon rate, and semiannual interest payments.

a. two years after the bonds were issued, the going rate of interest on bonds such as these fell to 6 percent. At what price would the bonds sell?

answer)

The bonds now have $n = 8 \times 2 = 16$ interest payments remaining until maturity, and their value is calculated as follows:

$$V_d = 50 \left[\frac{1 - \frac{1}{(1.03)^{16}}}{0.03} \right] + 1,000 \left[\frac{1}{(1.03)^{16}} \right]$$

$$= 50(12.61102) + 1,000(0.62317) = 628.05 + 623.17 = 1,251.22$$

Calculator solution: Input $N = 16$, $I/Y = 3$, $PMT = 50$, and $FV = 1,000$, compute $PV = -1,251.22$.

14. Many years ago, Minnow Bait and Tackle issued preferred stock. The stock pays an annual dividend equal to \$6.80. If the required rate of return on similar risk investments is 8 percent, what should be the market value of Minnow's preferred stock?

answer)

$$\hat{P}_0 = \frac{D}{r_{ps}} = \frac{\$6.80}{0.08} = \$85$$

15. The Ape Copy company's preferred stock pays an annual dividend equal to \$16.50. If investors demand a return equal to 11 percent to purchase Ape's preferred stock, what is its market value?

answer)

$$\hat{P}_0 = \frac{D}{r_{ps}} = \frac{\$16.50}{0.11} = \$150$$

16. Jones Brothers Clothing just issued preferred stock with a face value equal to \$80 that pays a 10 percent annual dividend. If the stock currently yields 8 percent, what is its market value?

answer)

$$\text{Dividend} = 0.10(\$80) = \$8$$

$$\hat{P}_0 = \frac{D}{r_{ps}} = \frac{\$8.00}{0.08} = \$100$$

17. Advanced Corporation's growth has slowed to a constant rate during the past few years. As a result, the company expects its common stock dividend to grow at a constant 4 percent for the remainder of the company's life. A few days ago, Advanced paid common stockholders a \$5 dividend. If the required rate of return on the company's stock is 12 percent, what is the value of the stock today?

answer)

$$\hat{D}_1 = \$5(1.04) = \$5.20$$

$$\hat{P}_0 = \frac{\hat{D}_1}{r_s - g} = \frac{D_0(1+g)}{r_s - g} = \frac{\$5.20}{0.12 - .04} = \$65$$

18. McCue Mining company's ore reserves are being depleted, so the firm's sales are falling. Also, its pit is getting deeper each year, so its costs are rising. As a result, the company's earnings and dividends are declining at a constant rate of 5 percent per year. If $D_0 = \$5$ and $r_s = 15\%$, what is the value of McCue Mining's stock?

$$\text{answer) } \hat{P}_0 = \frac{\hat{D}_1}{r_s - g} = \frac{D_0(1+g)}{r_s - g} = \frac{\$5[1 + (-0.05)]}{0.15 - (-0.05)} = \frac{\$4.75}{0.20} = \$23.75$$

19. The common stock of Union Jack Flags is currently selling for \$28 per share. The company's stock has been growing at a constant annual rate of 4 percent and this growth is expected to continue for an infinite period. The required rate on the stock is 11 percent. If you buy the stock today, what is the next dividend you would receive?

answer)

$$\hat{P}_0 = \frac{\hat{D}_1}{r_s - g} = \frac{D_0(1.04)}{0.11 - 0.04} = \$28.00$$

$$\hat{D}_1 = \hat{P}_0(r_s - g) = \$28(0.07) = \$1.96$$

20. Your company is considering two mutually exclusive projects – C and R- whose costs and cash flows are shown in the following table:

Year	Expected net cash flows	
	Project C	Project R
0	\$(14,000)	\$(22,840)
1	8,000	8,000
2	6,000	8,000
3	2,000	8,000
4	3,000	8,000

The projects are equally risky, and their required rate of return is 12 percent. You must make a recommendation concerning which project should be purchased. To determine which is more appropriate, compute the NPV of each project.

answer)

$$\begin{aligned} \text{NPV}_C &= -\$14,000 + \frac{\$8,000}{(1.12)^1} + \frac{\$6,000}{(1.12)^2} + \frac{\$2,000}{(1.12)^3} + \frac{\$3,000}{(1.12)^4} \\ &= -\$14,000 + \$8,000(0.89286) + \$6,000(0.79719) + \$2,000(0.71178) + \$3,000(0.63552) \\ &= -\$14,000 + \$7,142.88 + \$4,783.14 + \$1,423.56 + \$1,906.56 \\ &= -\$14,000 + \$15,256.14 \\ &= \$1,256.14 \end{aligned}$$

Calculator solution: $\text{NPV}_C = \$1,256.14$

$$NPV_R = -\$22,840 + \$8,000 \left[\frac{1 - \frac{1}{(1.12)^4}}{0.12} \right] = -\$22,840 + \$8,000(3.03735) = \$1,458.80$$

Calculator solution: $NPV_R = \$1,458.79$

$NPV_R > NPV_C$, so Project R should be accepted.

21. Diamond Hill Jewelers is considering the following independent projects:

Year	Expected net cash flows	
	Project Y	Project Z
0	\$(25,000)	\$(25,000)
1	10,000	0
2	9,000	0
3	7,000	0
4	6,000	36,000

Which project(s) should be accepted if the required rate of return for the project is 10 percent? Compute the NPVs for both project.

answer)

$$\begin{aligned}
 NPV_Y &= -\$25,000 + \frac{\$10,000}{(1.10)^1} + \frac{\$9,000}{(1.10)^2} + \frac{\$7,000}{(1.10)^3} + \frac{\$6,000}{(1.10)^4} \\
 &= -\$25,000 + \$10,000(0.90909) + \$9,000(0.82645) + \$7,000(0.75131) + \$6,000(0.68301) \\
 &= -\$25,000 + \$9,090.90 + \$7,438.05 + \$5,259.17 + \$4,098.06 \\
 &= -\$25,000 + \$25,886.18 = \$886.18
 \end{aligned}$$

Calculator solution: $NPV_Y = \$886.21$

$$\begin{aligned}
 NPV_Z &= -\$25,000 + \frac{\$0}{(1.10)^1} + \frac{\$0}{(1.10)^2} + \frac{\$0}{(1.10)^3} + \frac{\$36,000}{(1.10)^4} \\
 &= -\$25,000 + \$0(0.90909) + \$0(0.82645) + \$0(0.75131) + \$36,000(0.68301) \\
 &= -\$25,000 + \$0 + \$0 + \$0 + \$24,588.36 = -\$25,000 + \$24,588.36 = -\$411.64
 \end{aligned}$$

Calculator solution: $NPV_Z = -\$411.51$

$NPV_Y > 0$ and $NPV_Z < 0$, so only Project Y should be accepted.

22. Following is a table that shows expected cash flows of a machine that QQQ Inc. is currently evaluating for possible purchase. Both the expected annual cash flows (CF) and the present values (PV) of the cash flows are shown in the table.

Year	Expected CF	PV of CF using the firm's required rate of return, r
0	\$(10,000)	\$(10,000)
1	6,000	5,455
2	3,000	2,479
3	1,000	751
4	5,000	3,415

Compute both the traditional payback period and the discounted payback period.

answer)

PV of \hat{CF} Using the Firm's

Year	Expected \hat{CF}	Required Rate of Return, r	Cumulative \hat{CF}	Cumulative PV of \hat{CF}
0	\$(10,000)	\$(10,000)	\$(10,000)	\$(10,000)
1	6,000	5,455	(4,000)	(4,545)
2	3,000	2,479	(1,000)	(2,066)
3	1,000	751	0	(1,315)
4	5,000	3,415	5,000	2,100

$$PB_{\text{Traditional}} = 3.0$$

$$DPB = 3 + \frac{1,315}{3,415} = 3.39 \text{ years}$$

23. Based on the following probability distribution, what is the security's expected return?

State	Probability	r
1	0.2	-5.0%
2	0.3	10.0%
3	0.5	30.0%

answer)

$$\hat{r} = 0.2(-5\%) + 0.3(10\%) + 0.5(30\%) = 17.0\%$$

24. what is the expected return of the following investment?

Probability	Payoff
0.3	30.0%
0.2	10.0%
0.5	-2.0%

answer)

$$\hat{r} = 0.3(30\%) + 0.2(10\%) + 0.5(-2\%) = 10.0\%$$

25. Suppose that $r_{RF} = 5\%$ and $r_M = 12\%$. What is the appropriate required rate of return for a stock that has a beta coefficient equal to 1.5?

answer)

$$r = 5\% + (12\% - 5\%)1.5 = 15.5\%$$

26. The current risk-free rate of return, is 4 percent and the market risk premium is 5 percent. if the beta coefficient associated with a firm's stock is 2.0, what should be the stock's required rate return?

answer)

$$r = 4\% + (5\%)2.0 = 14\%$$

27. If the risk-free rate of return is 4 percent and the market return is expected to be 12 percent, what is the required rate of return for a stock with a beta equal to 2.5?

answer)

$$\begin{aligned} r_s &= r_{RF} + (r_M - r_{RF})\beta_s \\ &= 4\% + (12\% - 4\%)2.5 \\ &= 4\% + 20\% \\ &= 24\% \end{aligned}$$