FIN 301 – Exam 2 – Practice Exam Solutions

1. B – Hedge funds are largely illiquid. Hedge funds often take large positions in investments. This makes it difficult for hedge funds to move in and out of investments quickly.

2. B – Shares; Securities. Investment companies sell shares. They then use the revenue generated from selling shares to purchase securities.

3. C – 12 years. The rule 72 tell us the number of years needed to double an investment is 72 divided by the interest rate.

   72 / 6 = 12

4. E – Kenny shouldn't lend the money because all of the options are negative NPV investments

   The first step is to solve for the NPV of each option. Use the $3,500 has a negative number in CF 0 to represent a cash outflow.

   Option #1

   CF 0 = –3,500
   CF 1 = 750
   CF 2 = 750
   CF 3 = 750
   CF 4 = 750
   CF 5 = 750

   I = 6

   NPV = –341

   Option #2

   CF 0 = –3,500
   CF 1 = 0
   CF 2 = 0
   CF 3 = 4,000

   I = 6

   NPV = –142

   Option #3

   CF 0 = –3,500
   CF 1 to 10 = 425

   I = 6

   NPV = –372

5. B – For simple interest, interest is only earned on the original investment. For compound interest, interest is earned on both the original investment and the accumulated interest.

6. B – Reserves; Bonds

7. C – An investment's value is based on the present value of future cash flows, discounted for time and risk. This is what we are doing when we calculate NPV.

8. E – Round A investor have a higher rate of return than Round C investors. This is because Round A investors invest earlier than Round C investors so Round A investors are exposed to more risk.

9. C – On the first day of an IPO, average investors will lose money. This is because average investors will only be able to buy shares in an IPO if the large institutional investors don't want the shares because the IPO is not a good investment. When an IPO is a good investment, the average investor won't be able to purchase shares because the shares will all go to the large institutional investors.

10. C – Issuers receive funds in the primary market. Issuers are the company initially selling the stock. The company sells its stock in the primary market in exchange for funds from investors.

11. D – Manager are less accountable for their actions

12. B – OTC markets do not have trading floors

13. C – Commercial banks are judged by their Net Interest Margin

14. E – Deposits; Loans

15. B – Commercial banks primarily take deposits and make loans

16. B – The type of information covered by insider trading laws is well defined

17. D – The annual compounding will result in the investment earning less interest because it will earn interest on previous payments less often

18. D – Property rights are unprotected

19. C – VC firms typically see over 90% of their investments fail

20. C – An option for the underwriter to sell an additional 15% of the offering at the offer price

21. C – Insurance companies primarily invest in the bond market

22. C – Foreign exchange

23. D – The 2-20 fee structure is the primary reason for the growth of hedge funds because the 2-20 fee structure makes running a hedge an extremely lucrative opportunity

24. E – Both C and D

25. E – You are buying stock so you look at the ask price, which is the second number listed. You want to buy at the lowest ask price.

26. C – Commercial banks

27. C – Hedge funds are intermediaries between investors and the markets

28. B – This is bad because this means that customers are paying their bills more slowly. Receivables turnover measures the number of times a firm collects its accounts receivable per year. If a firm's receivables turnover decreases, it means that it is taking the firm longer to collect payments from its customers.

    Receivables turnover = Sales / Accounts receivable

29. E – All of the above

30. E – Both A and C

31. E – Both C and D

32. C – Hedge funds are mostly unregulated

33. E – The preliminary financial prospectus provided to the SEC before the IPO

34. D – The bond market is larger than the stock market

35. C – The primary way mutual funds fund their assets is by selling shares

36. B – Mutual funds because mutual funds receive a set percentage of assets under management. This means that the funds need to bring more assets under management to increase revenue.

37. D – You are selling stock so you need to look at the bid price, which is the first number listed. You want to sell your stock for the highest possible price.

38. E – Both A and C. If a firm makes slower payments to its suppliers, it gets to hold onto cash longer, so its cash conversion cycle will improve. If a firm is able to collect cash from customers faster, it will receive cash for sales sooner, and its cash conversion cycle will improve.

39. B – It was repealed in the 1990s to decrease the amount of influence the government had on the financial markets.

40. A – The creation of a consumer protection agency that ensures that consumers are protected

41. D – Compensation for Wall Street bankers is at an all-time low due to their role in the financial crisis. This statement is false. Make sure to note that all of the other statements about the recent financial crisis are true statements.

42. C – With simple interest, interest is earned only on the initial investment, whereas with compound interest, interest is earned on the original investment as well as on the interest already accrued.

43. B – Joe's account is worth $115 more than Steve's.

    <u>Steve (simple interest):</u>
    Annual interest = Beginning balance * r
    Annual interest = $3,000 * 0.06 = $180

    Total interest for 5 years = $180 * 5 years = $900

    FV = Principal + Total interest
    FV = $3,000 + $900 = $3,900

    <u>Joe (compound interest):</u>
    $FV = PV * (1 + r)^n$
    $FV = \$3,000 (1 + 0.06)^5 = \$4,015$

    Joe's account is worth $115 ($4,015 – $3,900 = $115) more than Steve's account.

44. E – Company E. This is the correct answer because company E has the lowest days sales outstanding (DSO). DSO is the best measure to determine which company most efficiently collects payments from its customers because DSO measures how long credit sales are outstanding before they are collected.

45. D – Company D. This is the correct answer because company D has the highest inventory turnover. Inventory turnover measures how many times inventory is bought, processed, and sold during a year.

46. B – VC firms make money only on about 10% of their investments. VC firms invest in high-risk, early stage companies. VC firms make money only on about 10% of their investments, but they are usually able to earn large enough returns on their profitable investments to compensate for the money they lose on their other investments.

47. B – Early stage venture capitalists can expect a higher return than later stage venture capitalists in an IPO. Early stage VC firms take more risk than later stage VC firms, so the early stage VC firms earn a higher rate of return to compensate for the additional risk.

48. D – Investors almost always lose money on the first day of IPO trading. This statement is false.

49. C – 50. The WACC and tax rate given in the problem were extra information that was not needed to solve the problem.

    Cash conversion cycle = DSI + DSO – DPO
    Cash conversion cycle = 45 + 20 – 15 = 50

50. B – $63,510

    Solution using equation:
    $FV = PV * (1 + r)^n$
    $FV = \$54,350 * (1 + .0225)^7 = \$63,510$

    Solution using the top row of the calculator:

n	i	PV	PMT	FV
7	2.25	54,350	0	Solve

    FV = –$63,510

    The FV amount is a negative number because of the way the calculator is programed. Since PV was put in as a positive number, FV came out as a negative number. If we had put PV in as a negative number, FV would have been positive. For these simple problems, the negative and positive signs don't really matter. They are just a result of the way the calculator is programmed. For more complex problems, the way we input the signs will matter, but we will deal with those issues when we get to those problems.

    In this problem, PMT is $0 because we are simply investing a lump sum today and we want to know what it will be worth in the future. We are not making any periodic payments in this problem. We will look at problems that deal with the PMT button later in this chapter.

51. A – $80,473

    Solution using equation:
    $FV = PV * (1 + r)^n$
    $FV = \$20,000 * (1 + .0475)^{30} = \$80,473$

    Solution using the top row of the calculator:

n	i	PV	PMT	FV
30	4.75	20,000	0	Solve

    FV = –$80,473

52. C – Invest when the cost of capital is less than the return on investment.

53. C – Stocks have unlimited liability. This statement is false because stocks have limited liability, which means that the investors cannot lose more money than they invested in the stock.

54. B – Merger activity is a common indication of the health of the overall market.

55. C – Target shareholders. The acquiring firm is buying the target firm, so the shareholders of the target firm receive payment from the acquiring firm.

56. B – Hostile takeover. In a hostile takeover, the management of the target company opposes the takeover, so the acquiring firm must deal directly with the target firm's shareholders.

57. D – $283,382

    Financial calculator:

n	i	PV	PMT	FV
30	7	0	3,000	Solve

    FV = –$283,382

    FV came out as a negative number because PMT was put in as a positive number. If we had put PMT in as a negative number, FV would have been positive.

    PV is zero in this problem because Steve is not investing a one-time cash flow today. If the problem had said that he invested $10,000 today and $3,000 at the end of every year for the next 30 years, then PV would have been $10,000. In this problem, he is simply making payments at the end of every year.

58. A – $22,253

    Financial calculator:

n	i	PV	PMT	FV
10	8.5	0	1,500	Solve

    FV = –$22,253

59. E – Hedge funds use advanced investment strategies and have the benefit of lax regulation

60. D – An advertisement placed about an upcoming IPO

61. D – VC firms see around 90% of their investments go bust

62. E – Bank financing because it asks about the first outside source of capital. The first source of capital is owner's capital; however, this is not an outside source.

63. C – 3%

    After-tax rate of return = r * (1 – Tax rate)
    After-tax rate of return = 5% (1 – 0.40) = 3%

64. E – They are heavily regulated because of the riskiness of their investment strategies. This statement is false because hedge funds face very little government regulation.

65. E – $60,103

    After-tax rate of return = 5% (1 – 0.20) = 4%

n	i	PV	PMT	FV
12	4	0	4,000	Solve

    FV = –$60,103

    This problem is very similar to the annuity problem we just did; however, now we need to take the effect of taxes into account. You will notice in the first annuity problem that the interest rate was an "after-tax" rate. Some problems will specify that the rate is an after-tax rate, so you know that you don't need to solve for the after-tax rate of return. If you are given the tax rate in a problem like this, it means that the first step you need to do is solve for the after-tax rate of return.

66. E – All of the above

67. A – When the tax shield benefits equal the risk of financial distress

68. B – Spinoffs are usually a free transaction to shareholders.

69. B – Equity carve-outs issue an IPO to raise additional capital.

70. D – To transfer money between investors. Transferring money directly between investors is not a role of financial markets.

71. D – A savings account. This is not an example of a primary security because a savings account is a secondary security.

72. D – 8.76%

Financial calculator:

N	i	PV	PMT	FV
6	Solve	36,150	–8,000	0

i = 8.76%

This is the first problem that we have looked at where how you input the positive and negative amounts into the calculator matters. Peter took out a $36,150 loan and then made annual payments of $8,000 at the end of each year for 6 years. The problem told you that he paid off the loan at the end of 6 years, so you know that the FV is $0 because the loan is paid off.

You get the same answer for i if you make PV negative and PMT positive; however, you receive an error message if you make both of the values the same sign. The values have opposite signs because the cash flows are moving in opposite directions. Peter *received* $36,150 as a loan to pay for school. He then *paid out* $8,000 each year for 6 years to repay the loan.

73. C – 7.94%

Financial calculator:

n	i	PV	PMT	FV
20	Solve	0	110,000	–5,000,000

i = 7.94%

Chris has not invested any money up to this point, so the PV is $0. He plans to make payments of $110,000 *into* his retirement account for 20 years. Then, at the end of 20 years, he wants to be able to take $5,000,000 *out* of his retirement account.

Since PMT represents what Chris is putting into his account and FV represents what Chris is taking out of his account, the two amounts need to have opposite signs. You could have made PMT negative and FV positive; however, if PMT and FV have the same sign, you will get an error message.

74. A

Financial calculator:

n	i	PV	PMT	FV
24	Solve	–2,963	0	12,684

i = 6.25%

In this problem, you invested $2,963, and over 24 years, it grew to $12,684. You can think of the $2,963 as money that you are putting *into* the account and the $12,684 as money you are taking *out* of the account. This is why PV and FV must have opposite signs. If you input them both with the same signs, you will get an error message.

75. C – 15

Financial calculator:

n	i	PV	PMT	FV
Solve	6.1	120,000	–12,436	0

n = 15

It is important to make sure that PV and PMT have opposite signs because those cash flows are moving in opposite directions. Sarah *receives* $120,000 when she takes out the loan, and then she *pays* $12,436 each year until the loan is paid off.

FV is $0 because the problem asks you to figure out how long it will take her to pay off the $120,000 loan with annual payments of $12,436. Since she is paying off the loan in full, the value of the loan will be $0 at the end of the loan's life.

76. B – $2,000

Tax shield = (Amount of debt)(Interest rate)(Tax rate)
Tax shield = ($100,000)(0.05)(0.40) = $2,000

77. D – Software designer. Technology, drug, and biotech firms tend to use small amounts of debt. Public utilities, airline, media, and real estate firms tend to use large amounts of debt.

78. A – 8.84%

Total market value of debt and equity = Market value of debt + Market value of equity
Total market value of debt and equity = $1 million + $4 million = $5 million

Weight of debt = Market value of debt / Total market value of debt and equity
Weight of debt = $1 million / $5 million = 0.20

Weight of equity = Market value of equity / Total market value of debt and equity
Weight of equity = $4 million / $5 million = 0.80

WACC = (Weight of debt)(Cost of debt)(1 – Tax rate) + (Weight of equity)(Cost of equity)
WACC = (0.20)(7%)(1 – 0.40) + (0.80)(10%) = 8.84%

79. A – You will get $16,764 more if you choose the IRA.

<u>Savings account:</u>
After tax rate of return = 10% (1 – 0.25) = 7.5%

n	i	PV	PMT	FV
20	7.5	0	–1,200	Solve

FV = $51,966

In this example, FV is a positive number because we input PMT as a negative number. If we had made PMT positive, FV would have been negative. Don't overthink what these positive and negative signs mean, they simply relate to the way the calculator is programed.

This answer is saying that if you invest $1,200 at the end of every year for 20 years at a 7.5% interest rate, you will have $51,966 in your account at the end of 20 years.

<u>IRA account:</u>

n	i	PV	PMT	FV
20	10	0	–1,200	Solve

FV = $68,730

The interest rate for the IRA account is 10% because an IRA account is a tax-exempt account. Without doing any math, we know that the IRA account would have a higher ending balance because it earns a higher rate of return since it is a tax-exempt account.

Additional income from the IRA account = $68,730 – $51,966 = $16,764

80. D – $184,986

Equation:
PV = FV / $(1 + r)^n$
PV = $358,000 / $(1 + .045)^{15}$ = $184,986

Financial calculator:

n	i	PV	PMT	FV
15	4.5	Solve	0	358,000

PV = –$184,986

The PV is a negative number here because we input FV as a positive number. If we had input FV as a negative number, PV would have been positive.

PMT is zero in this problem because Paul is receiving a one-time lump sum payment 15 years from now. This calculation tells us what $358,000 is worth in today's dollars based on a 4.5% interest rate 15 years from now. This means that if the interest rate is 4.5%, Paul is indifferent between receiving $184,986 today or $358,000 15 years from now.

81. B – $36,216

Equation:
PV = FV / $(1 + r)^n$
PV = $40,000 / $(1 + 0.0125)^8$ = $36,216

Financial calculator:

n	i	PV	PMT	FV
8	1.25	Solve	0	40,000

PV = –$36,216

82. E – $13,355

Financial calculator:

n	i	PV	PMT	FV
5	4	Solve	3,000	0

PV = –$13,355

In this problem, PMT is $3,000 because the investor will receive $3,000 each year. Since the $3,000 payments are a set payment for a set period of time, we know that we are dealing with an annuity. If we had input PMT as a negative number, PV would have been a positive number.

FV is zero in this problem because there is no one-time lump sum cash flow that occurs at the end of year 5. If the problem had said that the investor will also receive an additional $10,000 at the end of year 5, then FV would have been $10,000. Compare the wording for this problem and the previous problem to see the difference between a one-time lump sum cash flow and an annuity.

83. D – The stock price will increase because of the positive NPV associated with investments. If a company is willing to invest additional capital in new investments, the company must believe that the new project will have a positive NPV. Positive NPV projects increase the value of a company.

84. C – $1,586.11

Interest expense year 1 = $137,000 x 0.065 = $8,905.00
Principal reduction year 1 = $10,491.11 – $8,905.00 = $1,586.11

The most common mistake people make on a problem like this is to multiply the interest rate by the amount of the annual payment instead of the principal balance.

These answers tell us that at the end of year 1, Nick has paid the bank $8,905.00 in interest and has reduced his principal (the amount he owes the bank) by $1,586.11.

Let's take a look to see what Nick will pay in interest and principal next year. Keep in mind that he is going to pay $10,491.11 every year for the life of the loan, but each year the amount of his interest expense will decrease and the amount of principal reduction will increase because the amount of his principal gets smaller and smaller each year.

Principal balance at the end of year 1 = $137,000 – $1,586.11 = $135,413.89
Interest expense year 2 = $135,413.89 x 0.065 = $8,801.90
Principal reduction year 2 = $10,491.11 – $8,801.90 = $1,689.21

Since Nick owed the bank less money at the start of year 2, his interest expense was lower at the start of year 2. His annual payment is always $10,491.11 for all 30 years of the loan, so in year 2, Nick is able to reduce his principal by $1,689.21, which is $103.10 ($1,689.21 – $1,586.11 = $103.10) more than in year 1. Each year, the amount of Nick's interest expense decreases, so the amount of his principal reduction increases because his annual payments stay the same.

You didn't need to do the calculations for year 2 to solve the problem, but understanding how loans work will be helpful in answering conceptual questions on the exam. If you did these calculations for all 30 years, you would find that Nick would owe exactly $0 at the end of 30 years.

85. B – $16,905

The first step in solving this problem is to determine the amount of the annual payments for the loan using your financial calculator.

n	i	PV	PMT	FV
5	6.75	–80,000	Solve	0

PMT = $19,381

This tells you that you will need to make annual payments of $19,381 for 5 years to pay off this $80,000 loan based on a 6.75% interest rate. Now that we have found the annual payment, we can solve for the total amount of interest paid over the life of the loan using the following equation.

Total interest expense = (Annual payment)(Number of years) – Amount of the loan
Total interest expense = ($19,381)(5 years) – $80,000 = $16,905

86. C – 6.136%

Effective annual rate (EAR) = $(1 + (\text{Annual interest rate} / m))^m - 1$
Effective annual rate (EAR) = $(1 + (0.06 / 4))^4 - 1 = 0.06136 = 6.136\%$

The value of m for this problem is 4 because the account compounds interest quarterly. We see that the effective annual rate is greater than the stated rate on the account because more frequent compounding increases the effective annual rate.

Make sure to always input your interest rate in decimal form when using the EAR equation. Also note that the amount that Cassidy invested was just extra information in this problem.

87. C – $15,656

The first step to solving this problem is finding the effective annual rate for the account. You know that you need to find the effective annual rate because interest is compounded monthly.

Effective annual rate (EAR) = $(1 + (\text{Annual interest rate} / m))^m - 1$
Effective annual rate (EAR) = $(1 + (0.09 / 12))^{12} - 1 = 0.0938 = 9.38\%$

Now that you know the effective annual rate, you can use the FV equation or the financial calculator to find the value of the account 5 years from now.

$FV = PV * (1 + r)^n$
$FV = \$10{,}000 * (1 + 0.0938)^5 = \$15{,}656$

n	i	PV	PMT	FV
5	9.38	10,000	0	Solve

FV = $15,656

88. E – Both B and D. A company's stock price will increase when a company announces it will increase its dividend because investors take the announcement as a signal that the company is confident about its future performance. A company's dividend policy gives insight into the company's overall investment opportunities.

89. A – 5%

Dividend yield = Dividend / Stock price
Dividend yield = $1 / $20 = 0.05 = 5%

90. C – 50%

Dividend payout ratio = Dividend / Earnings per share
Dividend payout ratio = $1 / $2 = 0.50 = 50%

91. C – 6%

Rule of 72:
Interest rate = 72 / Number of years
Interest rate = 72 / 12 = 6.000%

The rule of 72 will not always give you the exact answer because it is an inexact rule of thumb.

Financial calculator:

N	i	PV	PMT	FV
12	Solve	–1,000	0	2,000

i = 5.946%

Remember that we made up numbers for PV and FV. Any numbers would have worked for PV and FV as long as FV was double PV.

In this problem, we are inputting both PV and FV, so it is important that we pay attention to how we deal with the signs on PV and FV. The calculator thinks of one of the cash flows as an outflow and the other as an inflow. You can think of it as you invested $1,000 and got $2,000 back. You would have gotten the same answer if you made PV positive and FV negative; however, you would receive an error message if both PV and FV were the same sign.

92. D – A limit buy order

93. C – $392,652

Financial calculator:

n	I	PV	PMT	FV
12	7.25	Solve	50,096.35	0

PV = –$392,652

At first, this problem might seem confusing and overcomplicated. Your professor is using this problem to exemplify how changes in interest rates affect the value of loans.

The first thing you need to realize is if you took out a loan at 6% and then the interest rates immediately went up to 7.25%, you got a good deal. When you take out loans, you want the lowest interest rate possible, so Josh got a good deal in this scenario. The answer to this problem is saying that if Josh wants a 12-year loan with annual payments of $50,096.35 at a 7.25% interest rate, he would be able to borrow only $392,652 instead of $420,000. If he wanted to borrow the full $420,000 at a 7.25% interest rate, his annual payments would increase. However, the problem wants to know what the present value of the loan would be if everything stayed the same, other than the interest rate. This is why we used the interest rate of 7.25% instead of 6%.

The setup of this problem is a little confusing; however, solving it is actually fairly straightforward. The problem is just a complicated way of asking what the PV is for a 12-year, $50,096.35 annuity at a 7.25% interest rate. Make sure you are familiar with the wording for this problem so you know how to deal with this kind of problem if it appears on your exam.

94. A – $92,793

Financial calculator:

n	i	PV	PMT	FV
20	4.10	1,250,000	Solve	0

PMT = –$92,793

Jenny borrowed $1,250,000 to purchase a home. This means that she received $1,250,000 today. The problem says that she wants to payoff this loan in 20 years. The PV is $1,250,000 because it is the amount Jenny received today. The FV is $0 because at the end of 20 years, she will have paid off the loan, so she won't owe any more money.

This problem wants you to determine the amount of the payments that Jenny will need to make so that her loan will have a value of $0 at the end of 20 years based on a 4.10% interest rate. You can't just divide $1,250,000 by 20 to get the answer because Jenny will have to make interest payments each year as well. If Jenny pays $92,793 at the end of each year for 20 years, she will have the loan paid off at the end of 20 years.

95. B – DJIA

96. C – $11,862

Financial calculator:

n	i	PV	PMT	FV
5	4.55	52,000	Solve	0

PMT = –$11,862

97. D – $15,327

After-tax rate of return = r * (1 – Tax rate)
After-tax rate of return = 15% * (1 – 0.40) = 9%

Financial calculator:

n	i	PV	PMT	FV
15	9	0	Solve	450,000

PMT = –$15,327

98. D – 45 years

Financial calculator:

n	I	PV	PMT	FV
Solve	8	0	5,000	–2,000,000

n = 45 years

Liz wants to make $5,000 payments *into* her account at the end of each year, and then she wants to be able to take $2,000,000 *out* of her account when she retires. Since these cash flows are moving in opposite directions, they need to have opposite signs. If PMT and FV have the same sign, you will get an error message.

99. E – 9 years

Rule of 72:
Number of years = 72 / Interest rate
Number of years = 72 / 8% = 9 years

The rule of 72 will not always give you the exact answer because it is an inexact rule of thumb.

Financial calculator:

n	i	PV	PMT	FV
Solve	8%	–1,000	0	2,000

n = 9.01

Remember that we made up numbers for PV and FV. Any numbers would have worked for PV and FV as long as FV was double PV.

In this problem, we are inputting both PV and FV, so it is important that we pay attention to how we deal with the signs on PV and FV. The calculator thinks of one of the cash flows as an outflow and the other as an inflow. You can think of it as you invested $1,000 and got $2,000 back. You would have gotten the same answer if you made PV positive and FV negative; however, you would receive an error message if both PV and FV were the same sign.

100. E – Dealer 5: 25-26. When you are selling stock, you want to look at the dealer's bid price (the first number). You want to sell to the dealer with the *highest* bid price.

101. B – Dealer 2: 64-66. When you are buying stock, you want to look at the dealer's ask price (the second number). You want to buy from the dealer with the *lowest* ask price.

102. B – NPV is calculated using only net cash flow.

103. E – $102,442

In this problem, there is no cash flow in year 0. In many problems, you will be making an initial investment in a project in year 0, and then you will receive cash inflows from the project in future years. However, this problem simply wants you to find the present value of the cash flows in years 1–3 based on a 10% interest rate. Thus, the cash flow in year 0 is $0 for this problem.

Make sure to remember that when entering cash flows into the cash flow register, you enter the amount of the cash flow first, and then you press the CF_j button on your calculator. <u>You always enter the amount of the cash flow **before** pressing the CF_j button</u>.

CF 0 = 0
CF 1 = 35,000
CF 2 = 40,000
CF 3 = 50,000
i = 10

NPV = 102,442

This answer tells us that the present value of receiving $35,000 1 year from now, $40,000 2 years from now, and $50,000 3 years from now based on a 10% interest rate is $102,442. You could also say that if the interest rate is 10%, you would be indifferent between receiving $102,442 today or the cash flows in years 1–3 over the next 3 years.

You could have found this answer by finding the PV of each of the cash flows in years 1–3 and then adding them together. In fact, this is exactly what your calculator is doing for you. Here is what the math your calculator is doing for you when you use your cash flow register looks like:

PV of CF 1 = $35,000 / $(1 + 0.10)^1$ = $31,818
PV of CF 2 = $40,000 / $(1 + 0.10)^2$ = $33,058
PV of CF 3 = $50,000 / $(1 +0 .10)^3$ = $37,566

NPV = $31,818 + $33,058 + $37,566 = $102,442

As you can see, it wasn't too difficult to find the answer to this problem without using the cash flow register. However, when you start dealing with problems with more and more cash flows, the cash flow register will save you a lot of time and effort.

104. A – $243,652

In this problem, you are going to have a cash outflow in year 0 because the company is making an initial investment of $400,000 at the start of the project. Make sure that you always enter cash outflows as negative numbers and cash inflows as positive numbers.

Make sure to remember that when entering cash flows into the cash flow register, you enter the amount of the cash flow first, and then you press the CF_j button on your calculator. <u>You always enter the amount of the cash flow **before** pressing the CF_j button</u>.

CF 0 = –400,000
CF 1 = 65,000
CF 2 = 125,000
CF 3 = 600,000
i = 8

NPV = 243,652

If a project has an NPV of $0, the project is earning a rate of return exactly equal to the required rate of return. Since this project has a positive NPV, it means that this project is earning a rate of return greater than the project's required rate of return of 8%.

105. A – The discount rate that makes the NPV equal to zero.

106. C – Invest in the project if the net present value is greater than a predetermined rate of return.

107. C – 18.79%

The first step to solving this problem is to enter the cash flows in years 0–3 into your cash flow register. Make sure that you input the initial investment of $10,000 as a negative number because it is a cash outflow. Then, you will enter each of the cash flows in years 1–3 as positive numbers because they are cash inflows.

CF 0 = –10,000
CF 1 = 2,000
CF 2 = 5,000
CF 3 = 8,000

IRR = 18.79%

Note that you do not need to input an interest rate when solving for IRR. This answer tells us that the expected return for this project is 18.79%. We would accept this project as long as 18.79% is greater than the required rate of return for the project.

108. C – 20.73%

The first step to solving this problem is to enter the cash flows in years 0–3 into your cash flow register. Make sure that you input the initial investment of $700,000 as a negative number because it is a cash outflow. Then, you will enter each of the cash flows in years 1–3 as positive numbers because they are cash inflows.

CF 0 = –700,000
CF 1 = 350,000
CF 2 = 225,000
CF 3 = 450,000

IRR = 20.73%

Note that you do not need to input an interest rate when solving for IRR. This answer tells us that the expected return for this project is 20.73%. We would accept this project as long as 20.73% is greater than the required rate of return for the project.

109. B – Gross cash flows are used to calculate the payback period.

110. B – $1,352,297

In this problem, you are going to have a cash outflow in year 0 because the company is making an initial investment of $1.3 million at the start of the project. Make sure that you always enter cash outflows as negative numbers and cash inflows as positive numbers.

Make sure to remember that when entering cash flows into the cash flow register, you enter the amount of the cash flow first, and then you press the CF_j button on your calculator. <u>You always enter the amount of the cash flow **before** pressing the CF_j button</u>.

CF 0 = –1,300,000
CF 1 = 800,000
CF 2 = 1,100,000
CF 3 = 900,000
CF 4 = 420,000
i = 9

NPV = 1,352,297

If a project has an NPV of $0, the project is earning rate of return exactly equal to the required rate of return. Since this project has a positive NPV, this project is earning a rate of return greater than the project's required rate of return of 9%.

111. B – 5.0

Since the project is expected to generate $100,000 for all 6 years of the project, you can use the equation to solve for payback period.

Payback period = $500,000 / $100,000 = 5 years

The company will recover its initial investment of $500,000 in the project after 5 years. Note that you didn't need to use the discount rate of 4% to solve this problem.

112. B – 3.25 years

Our company will need to bring $100,000 in cash flows to recover the cost of its initial investment in the project. In the first 3 years of the project, we receive $90,000 ($20,000 + $40,000 + $30,000 = $90,000) in cash flows, so we will need to collect $10,000 in year 4 to achieve our full payback period.

The project is expected to bring in $40,000 in year 4, so we will not need to wait until the end of year 4 because we only need to collect $10,000 ($10,000/$40,000 = 0.25). This means we will reach our payback period in 3.25 years.

113. B – It is used to show the projects that will produce the best return given the amount that must be invested initially.

114. B – Project 2, then project 1. You want to invest in the projects with the highest profitability index first.

Profitability index = NPV / Project cost

Project 1 = $500,000 / $350,000 = 1.43
Project 2 = $425,000 / $170,000 = 2.50
Project 3 = $400,000 / $300,000 = 1.33

115. C – $1,586.11

Interest expense year 1 = $137,000 x 0.065 = $8,905.00
Principal reduction year 1 = $10,491.11 – $8,905.00 = $1,586.11

The most common mistake people make on a problem like this is to multiply the interest rate by the amount of the annual payment instead of the principal balance.

These answers tell us that at the end of year 1, Nick has paid the bank $8,905.00 in interest and has reduced his principal (the amount he owes the bank) by $1,586.11.

Let's take a look to see what Nick will pay in interest and principal next year. Keep in mind that he is going to pay $10,491.11 every year for the life of the loan, but each year the amount of his interest expense will decrease and the amount of principal reduction will increase because the amount of his principal gets smaller and smaller each year.

Principal balance at the end of year 1 = $137,000 – $1,586.11 = $135,413.89
Interest expense year 2 = $135,413.89 x 0.065 = $8,801.90
Principal reduction year 2 = $10,491.11 – $8,801.90 = $1,689.21

Since Nick owed the bank less money at the start of year 2, his interest expense was lower at the start of year 2. His annual payment is always $10,491.11 for all 30 years of the loan, so in year 2, Nick is able to reduce his principal by $1,689.21, which is $103.10 ($1,689.21 – $1,586.11 = $103.10) more than in year 1. Each year the amount of Nick's interest expense will decrease so the amount of his principal reduction will increase because his annual payments stay the same.

You didn't need to do the calculations for year 2 to solve the problem, but understanding how loans work will be helpful in answering conceptual questions on the exam. If you did these calculations for all 30 years, you would find that Nick would owe exactly $0 at the end of 30 years.

116. B – $16,905

The first step in solving this problem is to determine the amount of the annual payments for the loan using your financial calculator.

n	i	PV	PMT	FV
5	6.75	–80,000	Solve	0

PMT = $19,381

This tells you that you will need to make annual payments of $19,381 for 5 years to pay off this $80,000 loan based on a 6.75% interest rate. Now that we have found the annual payment, we can solve for the total amount of interest paid over the life of the loan using the following equation.

Total interest expense = (Annual payment)(Number of years) – Amount of the loan
Total interest expense = ($19,381)(5 years) – $80,000 = $16,905

117. B – It was repealed in the 1990s to decrease the amount of influence the government had on the financial markets.

118. A – The creation of a consumer protection agency that ensures that consumers are protected.

119. D – Compensation for Wall Street bankers is at an all-time low due to their role in the financial crisis.

120. C – Invest when the cost of capital is less than the return on investment.

121. C – Stocks have <u>limited</u> liability because the most you can lose is the amount of your initial investment.

122. E – All of the above

123. A – 8.84%

WACC = ($1 mil / $5 mil)(7%)(1 – 0.40) + ($4 mil / $5 mil)(10%) = 8.84%

124. C – $5,462

This problem needs to be solved in two steps. The first step is to determine the amount that Steve will need to have when he retires to be able to withdraw $70,000 per year for 20 years.

n	I	PV	PMT	FV
20	5	Solve	70,000	0

PV = $872,355

Steve will need a total of $872,355 saved by the time he retires. We now need to determine the amount that Steve will need to contribute annually for the next 45 years to accumulate $872,355 assuming an interest rate of 5%.

n	I	PV	PMT	FV
45	5	0	Solve	872,355

PMT = $5,462

If Steve contributes $5,462 every year for the next 45 years, he will have a total of $872,355 in his retirement account assuming the interest rate is 5%.

125. C – As beta decreases, CAPM will decrease as well. We can see in the equation below that if beta decreases, the required return on the investment will decrease as well. A lower beta represents a lower level of risk. As risk decreases, the required return on an investment will decrease as well.

$E(R_i) = (R_f) + (B_i)[E(R_m) – (R_f)]$

126. A – 12.4%

This problem provides us with more information than we need to solve the problem. All we need to do is use the CAPM equation to find the expected return.

$E(R_i) = (R_f) + (B_i)[E(R_m) – (R_f)]$
$E(R_i) = 4\% + (1.2)(11\% – 4\%)$
$E(R_i) = 12.4\%$

Note that we would have had to do an extra step if the problem asked for <u>observed return</u> instead of expected return. The observed return is what we actually earned on the investment. Since we are given the alpha value, we could find observed return; however, we don't need to do this for this problem. Make sure you pay attention to the difference between expected return (what we require based on CAPM) and observed return (what we actually earned).

Alpha = Observed return – Expected return

127. A – A measure of the difference between the observed return and the expected return for an asset

128. C – 8%

To solve this problem, you will need to use the CAPM equation. You can use the Treasury bill rate as the risk-free rate and the return on the S&P 500 as the expected return on the market. If you are not given any information about the firm-specific risk (FSR) for the company, you can assume that the FSR is zero.

$E(R_i) = (R_f) + (B_i)[E(R_m) – (R_f)] + FSR$
$E(R_i) = 2\% + (1.5)(6\% – 2\%) + 0\%$
$E(R_i) = 8\%$

129. C – Negative 7.9%

The most common mistake that people make on these problems is to compare the S&P 500 return, which represents the return on the market, to the portfolio's actual return. You need to compare the portfolio's actual return to the expected return on the portfolio. You are given the portfolio's actual return, and you can use the CAPM equation to solve for the expected return on the portfolio.

$E(R_{portfolio}) = (R_f) + (B_{portfolio})[E(R_m) – (R_f)]$
$E(R_{portfolio}) = 1.5\% + (1.8)(7\% – 1.5\%)$
$E(R_{portfolio}) = 11.4\%$

Alpha = Observed return – Expected return
Alpha = 3.5% − 11.4%
Alpha = −7.9%

130. D – Alpha measures the difference between a portfolio's expected return and its actual return.