FIN 301 – Final Exam – Practice Exam Solutions

1. D – 24.00%

   Coupon rate = Annual coupon payment / Face value

   We are told that this bond makes coupon payments of $6 every three months. Consequently, we need to convert the quarterly coupon of $6 to an annual coupon by multiplying it by four.

   Annual coupon payment = $6 x 4 = $24

   Coupon rate = $24 / $100 = 0.24 = 24.00%

2. D – 9.2%

   We are asked to find the required rate of return on this constant growth stock. We can use the following equation to value constant growth stocks. We already know the current price of the stock (P_0), so we will use the equation to solve for the required rate of return (r).

   $$P_o = \frac{D_1}{r - g}$$

   The only catch is that we are told the value of the most recent dividend (D_0) is $3, and we need to use the value of the dividend one year later (D_1) in our equation. Consequently, we will need to compound D_0 forward one period at the growth rate (g) to find D_1.

   $D_1 = D_0 \times (1 + g)$
   $D_1 = \$3 \times (1.05)$
   $D_1 = \$3.15$

   Now that we have D_1, we can use our constant growth stock valuation equation to solve for the required rate of return on the stock.

   $$\$75 = \frac{\$3.15}{r - 0.05}$$

   $$r - 0.05 = \frac{\$3.15}{\$75}$$
   $$r - 0.05 = 0.042$$
   $$r = 0.092$$
   $$r = 9.2\%$$

3. C – 12%

We will need to use our financial calculator to solve for the yield to maturity on the bond. Make sure to note that you must enter PV as a negative value. Then enter PMT and FV as positive values. PMT and FV need to have the opposite sign of PV because they are cash flows moving in opposite directions. If you enter all of the values as positive numbers, you will get an error message.

N	I	PV	PMT	FV
15	CMPT	–727.57	80	1,000

I = 12%

Note that we did not have to make an adjustment for semi-annual periods for this problem because the bond makes annual coupon payments.

4. A – 4.37%

We are not told the face value of this bond; however, we are told that the present value is 42.5% of the face value. We can use any number we would like as the face value of the bond, so let's use $1,000 since that is the face value of most bonds.

PV = $1,000 x 0.425
PV = $425

PMT is $0 because this is a zero coupon bond. We will need to enter PV as a negative and FV as a positive when solving for the yield in the calculator. If you enter both values as positive numbers, you will get an error when you solve for the yield.

N	I	PV	PMT	FV
20	CMPT	-425	0	1,000

I = 4.37%

5. D – $869,130

Total variable costs = ($3.28 + $2.85)(101,000) = $619,130
Total fixed costs = $250,000
Total costs = $619,130+ $250,000 = $869,130

6. A – 26,681

The cash break-even point occurs when the project's OCF is $0

$$Cash\ break\ even\ quantity = \frac{FC + \$0}{P - v} = \frac{FC}{P - v}$$

FC = Fixed costs
P = Price per unit
v = Variable cost per unit

$$Cash\ break\ even\ quantity = \frac{\$250{,}000}{\$15.50 - (\$3.28 + \$2.85)} = 26{,}681$$

7. B – 37,140

The accounting break-even point occurs when the project's net income is equal to $0. The accounting break-even point is found by setting OCF equal to depreciation.

$$Accounting\ break\ even\ quantity = \frac{FC + D}{P - v}$$

FC = Fixed costs
D = Depreciation
P = Price per unit
v = Variable cost per unit

$$Accounting\ break\ even = \frac{\$250{,}000 + \$98{,}000}{\$15.50 - (\$3.28 + \$2.85)} = 37{,}140$$

8. C – $1,126

Annual coupon payment = Face value x Coupon rate = $1,000 x 0.06 = $60
Semi-annual coupon payment = Annual coupon payment / 2 = $60 / 2 = $30

Since we are dealing with semi-annual coupon payments, we will need to multiply the number of years by 2 to find the number of semi-annual periods and divide the yield by 2 to find the semi-annual rate.

Semi-annual periods = 20 x 2 = 40
Semi-annual rate = 5% / 2 = 2.5%

Equation:

$$\boldsymbol{Bond\ value} = \boldsymbol{C} \times \left[\frac{\mathbf{1} - \left(\frac{\mathbf{1}}{(\mathbf{1}+\boldsymbol{r})^{\boldsymbol{t}}}\right)}{\boldsymbol{r}}\right] + \frac{\boldsymbol{FV}}{(\mathbf{1}+\boldsymbol{r})^{\boldsymbol{t}}}$$

$$\boldsymbol{Bond\ value} = \$\mathbf{30} \times \left[\frac{\mathbf{1} - \left(\frac{\mathbf{1}}{(\mathbf{1}+\mathbf{0.025})^{\mathbf{40}}}\right)}{\mathbf{0.025}}\right] + \frac{\$\mathbf{1,000}}{(\mathbf{1}+\mathbf{0.025})^{\mathbf{40}}} = \$\mathbf{1,126}$$

Financial Calculator:

N	I	PV	PMT	FV
40	2.5	CMPT	–30	–1,000

PV = $1,126

9. B – 1.60%

Fisher effect – The relationship between nominal returns, real returns, and inflation

R = Nominal rate (Treasury bill rate)
r = Real rate
h = Inflation rate

The real rate of interest can be approximated using the following equation.

$r \approx R - h$
$r \approx 2.7\% - 1.1\%$
$r \approx 1.60\%$

10. A – 1.58%

    The exact real rate of interest is found by using the following equation.

    r = [(1 + R) / (1 + h)] – 1
    r = [(1 + 0.027) / (1 + 0.011)] – 1
    r = 0.0158
    r = 1.58%

11. 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.

12. A – 0.99

    PV of Future Cash Flows
    Cf 0 = $0
    Cf 1 = $9,800
    Cf 2 = $7,900
    Cf 3 = $4,500
    I = 25%

    PV = $15,200

    Profitability index = PV of future cash flows / Initial cost
    Profitability index = $15,200 / $15,400
    Profitability index = 0.987

13. B – 2.57 years

    The first step when solving for discounting payback period is finding the present value of the project's cash flows.

    Year 1 = \$4,200 / $(1.07)^1$ = \$3,925.23
    Year 2 = \$5,000 / $(1.07)^2$ = \$4,367.19
    Year 3 = \$5,800 / $(1.07)^3$ = \$4,734.53
    Year 4 = \$3,700 / $(1.07)^4$ = \$2,822.71

    Now that we have the present value of the cash flows, we need to determine the length of time it will take to recover the project's initial investment using the discounted cash flows.

    \$11,000 – \$3,925.23 = \$7,074.77
    \$7,074.77 – \$4,367.19 = \$2,707.58

    After two years, we have \$2,707.58 remaining that we need to recover; however, we have a discounted cash flow value of \$4,734.53 in Year 3. This means that it will only take a portion of Year 3 to recover the remaining \$2,707.58.

    \$2,707.58 / \$4,734.53 = 0.5719

    Payback period = 2.5719

14. B – \$85.71

$$P_0 = \frac{D_1}{r - g} = \frac{\$4.20}{0.08 - 0.031} = \$85.71$$

15. C – 20.73%

    We will need to use the cash flow register in the financial calculator to find IRR.

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

    IRR = 20.73%

16. D – 20,001

    When a company uses straight voting, you need to have 50% of the shares outstanding plus one additional share to guarantee a seat on the board.

    Guaranteed seat = (50%)(Shares outstanding) + 1 share
    Guaranteed seat = (50%)(40,000) + 1 = 20,001

17. D – $640,032

    20,001 shares x $32 per share = $640,032

18. A – 8,001

    When a company uses cumulative voting, the number of shares required to guarantee a seat is determined by the number of board seats (N) up for election.

    $$\text{Gauranteed seat} = \left(\frac{1}{\text{N} + 1}\% \text{ of stock}\right)(\text{Shares outstanding}) + 1 \text{ share}$$

    $$\text{Guaranteed seat} = \frac{1}{4 + 1}(40{,}000) + 1 = 8{,}001$$

19. A – $256,032

    8,001 shares x $32 per share = $256,032

20. A – $1,786.11

Annual coupon payment = Face value x Coupon rate = $2,000 x 0.048 = $96
Semi-annual coupon payment = Annual coupon payment / 2 = $96 / 2 = $48

Since we are dealing with semi-annual coupon payments, we will need to multiply the number of years by 2 to find the number of semi-annual periods and divide the yield by 2 to find the semi-annual rate.

Semi-annual periods = 25 x 2 = 50
Semi-annual rate = 5.6% / 2 = 2.8%

Equation:

$$\text{Bond value} = \text{C} \times \left[\frac{1 - \left(\frac{1}{(1+\text{r})^{\text{t}}}\right)}{\text{r}}\right] + \frac{\text{FV}}{(1+\text{r})^{\text{t}}}$$

$$\text{Bond value} = \$48 \times \left[\frac{1 - \left(\frac{1}{(1+0.028)^{50}}\right)}{0.028}\right] + \frac{\$2{,}000}{(1+0.028)^{50}} = \$1{,}786.11$$

Financial Calculator:

N	I	PV	PMT	FV
50	2.8	CMPT	–48	–2,000

PV = $1,786.11

21. A – 6.57%

Required return (r) = Dividend yield + Capital gains yield
Required return (r) = (D_1 / P_0) + g
Required return (r) = ($2.88 / $88) + 0.033
Required return (r) = 0.0657 = 6.57%

22. C – $1,597,000

VC = ($13.45 + $7.95)(55,000) = $1,177,000
FC = $420,000
TC = $1,177,000 + $420,00 = $1,597,000

23. C – $21.40

    MC per unit = VC per unit = $13.45 + $7.95 = $21.40

24. C – $29.04

    Average cost = TC / Q = $1,597,000 / 55,000 = $29.04

25. A – $85,600

    Minimum acceptable revenue = MC per unit x # units = $21.40 x 4,000 = $85,600

26. A – $38.13

    Stock price = Benchmark P/S ratio x Sales per share

    Sales per share = $500k / 80k = $6.25

    Stock price = 6.1 x $6.25 = $38.13

27. A – 1.45%

    $$\text{Dividend yield} = \frac{D_{t+1}}{P_t} = \frac{\$1.42}{\$98} = 0.0145 = 1.45\%$$

28. A – Negative 7.14%

    $$\text{Capital gains yield} = \frac{(P_{t+1} - P_t)}{P_t} = \frac{(\$91 - \$98)}{\$98} = -0.0714 = -7.14\%$$

29. B – Negative 5.69%

    $$\text{Total return} = \text{Dividend yield} + \text{Capital gains yield} = 1.45\% + -7.14\% = -5.69\%$$

30. C – 2

    There will be two IRRs because the sign of the cash flows changes from negative to positive and back to negative. Since the sign changes twice, there will be two IRRs that result in the project having an NPV of $0.

31. B – $54,430

    Annual depreciation = $100,000 / 10 = $10,000
    Accumulated depreciation year 6 = $10,000 x 6 = $60,000
    Book value end of year 6 = $100,000 – $60,000 = $40,000

    Pre-tax salvage value = $57,000

    Selling the equipment will generate a tax liability because the salvage value at the end of year six is greater than the book value.

    Tax liability = (Salvage value – Book value)(Tax rate) = ($57,000 – $40,000)(0.21) = $3,570

    After-tax cash flow = $57,000 – $3,570 = $54,430

32. D – $105

    Annual coupon = $1,000 x 9% = $90

    Capital gain = $1,045 – $1,030 = $15

    Total dollar return = $90 + $15 = $105

33. B – 10.19%

    Nominal return = Total dollar return / Initial investment
    Nominal return = $105 / $1,030 = 0.1019 = 10.19%

34. A – 5.96%

    To solve for the real rate of return, we need to use the following equation.

    R = Nominal return
    r = Real rate of return
    h = Inflation

    $r = [(1 + R) / (1 + h)] – 1$
    $r = [(1 + 0.1019) / (1 + 0.04)] = 0.0596 = 5.96\%$

35. D – 22.14%

Average accounting return (AAR) = Average net income / Average book value

Average net income = ($1.4m + $1.2m + $1.7m + $1.9m) / 4 = $1.55m

Since we are told that the asset will be depreciated to $0 over its four-year life, we find the average book value by taking the average of the initial investment of $14m and $0. This works out where we simply divide $14m by 2 to get the average book value.

Average book value = ($14m + $0) / 2 = $7m

Average accounting return (AAR) = Average net income / Average book value
Average accounting return (AAR) = $1.55m / $7m
Average accounting return (AAR) = 0.2214 = 22.14%

36. C – €1,159.89

Annual coupon = €1,000 x 0.067 = €67

$$\text{Bond value} = \text{C} \times \left[\frac{1 - \left(\frac{1}{(1+\text{r})^{\text{t}}}\right)}{\text{r}}\right] + \frac{\text{FV}}{(1+\text{r})^{\text{t}}}$$

$$\text{Bond value} = 67 \times \left[\frac{1 - \left(\frac{1}{(1+0.053)^{18}}\right)}{0.053}\right] + \frac{1{,}000}{(1+0.053)^{18}} = 1{,}159.89$$

Financial Calculator:

N	I	PV	PMT	FV
18	5.3	CMPT	-67	-1,000

PV = 1,159.89

37. C – $162,046

Use the MARCS rates provided in the MARCS table to calculate depreciation each year for the equipment cost of $1,200,000.

Depreciation expense = Equipment cost x MARCS%

Once you fill in the depreciation expense column, you can solve for the beginning and ending book values each year.

Year	Beginning Balance	Depreciation	Ending Balance
1	$1,200,000	$240,000	
2		$384,000	
3		$230,400	
4		$138,240	
5		$138,240	
6		$69,120	

Endings book value = Beginning book value – Depreciation expense

The next year's beginning book value will always be equal to the previous year's ending book value.

Year	Beginning Balance	Depreciation	Ending Balance
1	$1,200,000	$240,000	$960,000
2	$960,000	$384,000	$576,000
3	$576,000	$230,400	$345,600
4	$345,600	$138,240	$207,360
5	$207,360	$138,240	$69,120
6	$69,120	$69,120	$0

Book value end of year 4 = $207,360
Salvage value in year 4 = $150,000

Since the book value is greater than the salvage value, Nike will have a tax credit for selling the equipment.

Tax credit = (Book value – Salvage value)(Tax rate)
Tax credit = ($207,360 – $150,000)(0.21)
Tax credit = $12,045.60

After-tax salvage value = Salvage value + Tax credit
After-tax salvage value = $150,000 + $12,045,60
After-tax salvage value = $162,045.60

38. B – 4.9%

Required return (r) = Dividend yield + Capital gains yield

The problem tells us that the dividend yield and capital gains yield are equal. This means we can find the dividend yield and capital gains yield by dividing the required return by two.

Dividend yield = Capital gains yield = 9.8% / 2 = 4.9%

Note that this is also the growth rate for the stock because the capital gains yield is the growth rate.

39. D – $3.68

We can use the equation for the present value of a constant growth stock to solve for next year's dividend.

$$P_0 = \frac{D_1}{r - g}$$

$P_0 \times (r - g) = D_1$
$D_1 = P_0 \times (r - g)$
$D_1 = \$75 \times (0.098 - 0.049)$
$D_1 = \$3.68$

40. C – $3.51

To find the current dividend, we discount next year's dividend back one period using the growth rate.

$D_0 = D_1 / (1 + g)$
$D_0 = \$3.68 / (1 + 0.049)$
$D_0 = \$3.51$

41. A – $4,670,000

First, we need to find the total sales generated by the vape cartridges. Then we need to subtract the lost sales from Sour Diesel and add the gained sales from gummies.

Vape sales = 90,000 x $55 = $4,950,000
Lost Sour Diesel sales = –5,700 x $80 = –$456,000
Gained Gummy sales = 8,800 x $20 = $176,000

Annual sales = $4,950,000 – $456,000 + $176,000 = $4,670,000

42. B – 11.92%

The discount rate where the company would be indifferent between two mutually exclusive projects is known as the crossover rate. The first step in solving for the crossover rate is to take the difference between the cash flows for project A and project B. This is why we added an additional column to the table below.

Year	Cash Flow (A)	Cash Flow (B)	B – A
0	-$35,000.00	-$35,000.00	$0.00
1	$18,400.00	$21,500.00	$3,100.00
2	$19,200.00	$18,500.00	-$700.00
3	$18,500.00	$15,400.00	-$3,100.00

Once you find the difference in cash flows, you then solve for IRR using the difference in cash flows.

Cf 0 = $0
Cf 1 = $3,100
Cf 2 = –$700
Cf 3 = –$3,100

IRR = 11.92%

43. B – $316,400

Sales	$480,000
–Costs	$130,000
–Depreciation	$190,000
EBIT	$160,000
–Taxes	$33,600
Net Income	$126,400

OCF = EBIT + Depreciation – Taxes
OCF = $160,000 + $190,000 – $33,600
OCF = $316,400

44. B – $39,500

The fixed asset has been fully depreciated by the end of year 3. Consequently, the company will need to pay taxes on the full market value of $50,000.

Taxes = (Market value – Book value)(Tax rate)
Taxes = ($50,000 – $0)(0.21)
Taxes = $10,500

After tax salvage value	
Sell equipment	$50,000
Taxes	-$10,500
After tax salvage value	$39,500

45. C – $260,256

Capital spending
Honda spent $570,000 in Year 0 when it invested in the fixed asset. Then the company received the after-tax salvage value of $39,500 in Year 3 when it sold the fixed asset.

Net working capital (NWC)
The project required an investment of $80,000 in net working capital in Year 0. The net working capital investment of $80,000 was then recovered in Year 3 at the end of the project's life.

Operating cash flow (OCF)
The project generates OCF of $316,400 in Years 1, 2, and 3.

	Year 0	Year 1	Year 2	Year 3
Capital Spending	-$570,000			$39,500
NWC	-$80,000			$80,000
OCF		$316,400	$316,400	$316,400
Total Cash Flow	-$650,000	$316,400	$316,400	$435,900
NPV	$260,256			

Net present value (NPV)
Find the total cash flow for each year by adding the capital spending, NWC, and OCF for that year. Use the required rate of return of 8% to discount the future cash flows to Year 0. NPV will be the present value of future cash flows minus the initial outflow in Year 0.

Cf 0 = –$650,000
Cf 1 = $316,400
Cf 2 = $316,400
Cf 3 = $435,900
I = 8%

NPV = $260,256

46. C – 4.38 years

The first step when solving for the discounted payback period is to discount all future cash flows back to Year 0.

Year 1 = \$6,500 / $(1.05)^1$ = \$6,190.48
Year 2 = \$6,500 / $(1.05)^2$ = \$5,895.69
Year 3 = \$6,500 / $(1.05)^3$ = \$5,614.94
Year 4 = \$6,500 / $(1.05)^4$ = \$5,347.57
Year 5 = \$6,500 / $(1.05)^5$ = \$5,092.92

Now we will use the discounted cash flows to determine how long it will take us to recover the initial investment of \$25,000.

\$25,000 – \$6,190.48 = \$18,809.52
\$18,809.52 – \$5,895.69 = \$12,913.83
\$12,913.83 – \$5,614.94 = \$7,298.89
\$7,298.89 – \$5,347.57 = \$1,951.32

After four years, we still need to recover \$1,951.32; however, the discounted cash flow for Year 5 is \$5,092.92. Consequently, it will only take a portion of Year 5 to recover the remaining \$1,951.32.

\$1,951.32 / \$5,092.92 = 0.3831

Discounted payback period = 4.3831

47. A – 12,143

Annual depreciation = \$150,000 / 10 = \$15,000

FC = Fixed costs
D = Depreciation
P = Price per unit
v = Variable cost per unit

$$Accounting\ break\ even = \frac{FC + D}{P - v} = \frac{\$70{,}000 + \$15{,}000}{\$25 - 18} = 12{,}143$$

48. A – 5.67

This trick to this problem is realizing that OCF is equal to depreciation at the accounting break-even point.

OCF = Depreciation = $15,000

$$DOL = 1 + \frac{FC}{OCF} = 1 + \frac{\$70{,}000}{\$15{,}000} = 5.67$$

49. D – 2.46%

Annual coupon payment = $1,000 x 0.03 = $30
Semi-annual coupon payment = $30 / 2 = $15

Since we are dealing with semi-annual coupon payments, we will need to multiply the number of years by 2 to find the number of semi-annual periods.

Semi-annual periods = 25 x 2 = 50

Now we need to use our financial calculator to solve for the semi-annual rate.

N	I	PV	PMT	FV
50	CMPT	–1,100	15	1,000

I = 1.23%

However, this is not the final answer to the problem. Since we used semi-annual values in our calculation, 1.23% is the semi-annual rate. We need to multiply 1.23% by 2 to get the yield.

Yield = 1.23% x 2 = 2.46%

50. B – $1,352,297

NPV = PV of future cash flows – Initial investment

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

51. C – $12.5 million

The original purchase price of $1.2 million is a sunk cost so it should be ignored when calculating the initial investment in fixed assets. However, the $2.5 million value of the land today is relevant because it is an opportunity cost. The company could earn $2.5 million if it sold the land instead of moving forward with the new project.

Initial investment = $2.5m + $8.1m + $1.9m = $12.5m

52. C – $16,068

Use the MARCS rates provided in the MARCS table to calculate depreciation each year for the equipment cost of $120,000.

Depreciation expense = Equipment cost x MARCS%

Once you fill in the depreciation expense column, you can solve for the beginning and ending book values each year.

Year	Beginning Book Value	Depreciation	Ending Book Value
1	$120,000	$17,148	
2		$29,388	
3		$20,988	
4		$14,988	
5		$10,716	
6		$10,704	
7		$10,716	
8		$5,352	

Endings book value = Beginning book value – Depreciation expense

The next year's beginning book value will always be equal to the previous year's ending book value.

Year	Beginning Book Value	Depreciation	Ending Book Value
1	$120,000	$17,148	$102,852
2	$102,852	$29,388	$73,464
3	$73,464	$20,988	$52,476
4	$52,476	$14,988	$37,488
5	$37,488	$10,716	$26,772
6	$26,772	$10,704	**$16,068**
7	$16,068	$10,716	$5,352
8	$5,352	$5,352	$0

53. B – $18,480

Sales	$88,000
Costs	$67,000
Depreciation	$9,000
EBIT	$12,000
Taxes (21%)	$2,520
Net Income	$9,480

Operating cash flow = EBIT + Depreciation – Taxes
Operating cash flow = $12,000 + $9,000 – $2,520
Operating cash flow = $18,480

54. C – $4,851.44

We are told that this is a zero-coupon bond, which means the bond does not make coupon payments. However, the bond does compound semi-annually, so we still need to convert our number of periods to semi-annual periods and our yield to a semi-annual rate.

Semi-annual periods = 28 x 2 = 56
Semi-annual rate = 2.6% / 2 = 1.3%

Equation:
The first term in the bond valuation equation finds the present value of the bond's coupons. This term is $0 because the amount of the coupon (C) is $0.

$$\text{Bond value} = \text{C} \times \left[\frac{1 - \left(\frac{1}{(1+\text{r})^{\text{t}}}\right)}{\text{r}}\right] + \frac{\text{FV}}{(1+\text{r})^{\text{t}}}$$

$$\text{Bond value} = 0 \times \left[\frac{1 - \left(\frac{1}{(1+0.013)^{56}}\right)}{0.013}\right] + \frac{10{,}000}{(1+0.013)^{56}} = \$4{,}851.44$$

Financial Calculator:

N	I	PV	PMT	FV
56	1.3	CMPT	0	-10,000

PV = 4,851.44

55. A – 2.84%

We use the following equation to find the present value of a stock when the annual dividend does not change over time.

$$P_0 = \frac{D}{r}$$

$$r = \frac{D}{P_0} = \frac{\$1.25}{\$44} = 0.0284 = 2.84\%$$

56. B – 8.20%

$$\text{Average return} = \frac{\mathrm{R_1 + R_2 + R_3 + \ldots + R_n}}{\mathrm{n}}$$

$$\text{Average return} = \frac{11\% + 28\% + 4\% + -9\% + 7\%}{5} = 8.20\%$$

57. A – 0.01787

Variance is the squared difference between the actual return and the average return.

$$\sigma^2 = \frac{\Sigma(X - \bar{X})^2}{N - 1}$$

$$\sigma^2 = \frac{(.11 - .082)^2 + (.28 - .082)^2 + (.04 - .082)^2 + (-.09 - .082)^2 + (.07 - .082)^2}{5 - 1}$$

$$\sigma^2 = 0.01787$$

58. C – 13.37%

Standard deviation is the positive square root of variance.

$$\sigma = \sqrt{0.01787} = 0.1337 = 13.37\%$$

59. B – It decreases

Bond prices and interest rates move in opposite directions.

60. B – $15,800

Sales = $40,000
VC = $40,000(.30) = $12,000
FC = $3,000
Depreciation = $5,000
EBIT = $20,000
Tax = $20,000(.21) = $4,200
Net Income = $15,800

61. C – 3.73%

R = Nominal rate (Treasury bill rate)
r = Real rate
h = Inflation rate

R = r + h + (r x h)
R = 0.011 + 0.026 + (0.011 x 0.026)
R = 0.0373
R = 3.73%

62. B – 2.77%

$$\text{Dividend yield} = \frac{D_{t+1}}{P_t} = \frac{\$3.08}{\$111} = 0.0277 = 2.77\%$$

63. C – 10.81%

$$\text{Capital gains yield} = \frac{(P_{t+1} - P_t)}{P_t} = \frac{(\$123 - \$111)}{\$111} = 0.1081 = 10.81\%$$

64. C – 13.58%

Total return = Dividend yield + Capital gains yield
Total return = 2.77% + 10.81%
Total return = 13.58%

65. A – 2.55%

R = Nominal rate (Total return)
r = Real rate
h = Inflation rate

h = [(1 + R) / (1 + r)] – 1
h = [(1 + 0.087) / (1 + 0.06)] – 1
h = 0.0255
h = 2.55%

66. B – Net present value

67. B – The stand-alone principle

68. D – 14.0%

The first step is solving for the amount of the semi-annual coupon payment with the financial calculator.

Semi-annual periods = 25 x 2 = 50
Semi-annual rate = 11% / 2 = 5.5%

N	I	PV	PMT	FV
50	5.5	–1,253.97	CMPT	1,000

PMT = 70

Semi-annual coupon payment = $70
Annual coupon payment = $70 x 2 = $140

Annual coupon payment = Face value x Coupon rate
$140 = $1,000 x Coupon rate
Coupon rate = $140 / $1,000
Coupon rate = 0.14 = 14%

69. B – $50.76

Stock price = Benchmark P/E ratio x EPS
Stock price = 27 x $1.88
Stock price = $50.76

70. D – Accept the project if IRR is greater than the company's required rate of return

71. B – Erosion

72. D – $97.95

Annual depreciation expense = $75 / 5 = $15

Now that we know the annual depreciation expense, we can use it to create an income statement. We are not given the amount of sales and costs for the project; however, we are told that the difference between sales costs is $120.

Sales	?
Costs	?
	$120
Depreciation	$15
EBIT	$105
Taxes (21%)	$22.05
Net Income	$82.95

Operating cash flow = EBIT + Depreciation – Taxes
Operating cash flow = $105 + $15 – $22.05
Operating cash flow = $97.95

73. A – $3.15

Depreciation tax shield = Depreciation x Tax rate
Depreciation tax shield = $15 x 0.21
Depreciation tax shield = $3.15

74. C – Unit selling price minus unit variable cost

75. C – $8,000

The trick to this problem is realizing that operating cash flow equals depreciation at the accounting break-even point. All that you needed to know was the amount of depreciation to answer the problem. The rest of the information provided was just extra information.

Operating cash flow = Depreciation = $8,000

76. B – Mutually exclusive projects

The company only needs one of the software options. The projects are mutually exclusive because using one of the software options means that the company won't use the other software option.

77. C – 15.0%

$$Dividend\ yield = \frac{D_1}{P_0}$$

$$Dividend\ yield = \frac{(\$1.50)(4)}{\$40}$$

$$Dividend\ yield = \frac{\$6}{\$40}$$

$$Dividend\ yield = 0.15$$

$$Dividend\ yield = 15.0\%$$

78. D – $280,916

Depreciation = Fixed asset investment x MACRS%

OCF = EBIT + Depreciation – Taxes

	Year 1	Year 2	Year 3
Sales	$500,000	$500,000	$500,000
Costs	$170,000	$170,000	$170,000
Depreciation	$216,645	$288,925	$96,265
EBIT	$113,355	$41,075	$233,735
Taxes (21%)	$23,805	$8,626	$49,084
Net Income	$89,550	$32,449	$184,651
OCF	$306,195	$321,374	**$280,916**

79. C – $69,365

Book value Year 3 = Fixed asset investment – Depre Year 1 – Depre Year 2 – Depre Year 3
Book value Year 3 = $650,000 – $216,645 – $288,925 – $96,265
Book value Year 3 = $48,165

Selling the equipment will generate a tax liability because the salvage value (market value) at the end of year 3 is greater than the book value.

Tax liability = (Salvage value – Book value)(Tax rate)
Tax liability = ($75,000 – $48,165)(0.21)
Tax liability = $5,635

After-tax salvage value = Market value – Tax liability
After-tax salvage value = $75,000 – $5,635
After-tax salvage value = $69,365

80. B – $72,441

Capital spending
GM spent $650,000 in Year 0 when it invested in the fixed asset. Then the company received the after-tax salvage value of $69,365 in Year 3 when it sold the fixed asset.

Net working capital (NWC)
The project required an investment of $140,000 in net working capital in Year 0. The net working capital investment of $140,000 was then recovered in Year 3 at the end of the project's life.

	Year 0	Year 1	Year 2	Year 3
Capital spending	($650,000)			$69,365
NWC	($140,000)			$140,000
OCF		$306,195	$321,374	$280,916
Total cash flow	($790,000)	$306,195	$321,374	$490,280

NPV $72,441

Net present value (NPV)
Find the total cash flow for each year by adding the capital spending, NWC, and OCF for that year. Use the required rate of return of 13% to discount the future cash flows to Year 0. NPV will be the present value of future cash flows minus the initial outflow in Year 0.

Cf 0 = –$790,000
Cf 1 = $306,195
Cf 2 = $321,374
Cf 3 = $490,280
I = 13%

NPV = $72,441

81. A – Proxy