Real Estate Financial Modeling – Certification Quiz Questions

Module 2 – 4-Hour Office Development Modeling Test (100 Bishopsgate)

1. You are working on an office/retail development model, and you have built a monthly tenant-by-tenant schedule that separates each tenant into 3 cases: the initial lease, the renewal lease, and the non-renewal case where a new tenant moves in upon lease expiration.

   As part of this process, you must determine the calendar months in which the tenant's rent increases in each case. The formula for the rental escalation under the "initial lease" case is shown below:

A	B	C	D	E	BL	BM	BN	BO	BP
1									
2	**Monthly Projections - Construction and Lease-Up Period**								
3	(£ in GBP as Stated)								
35	**Rent Roll:**		*Units:*		**Mar-20**	**Apr-20**	**May-20**	**Jun-20**	**Jul-20**
36									
37	Monthly Change in Market Rental Rates:		%		0.29%	0.29%	0.29%	0.29%	0.29%
38									
39	Expense Inflation:		%		0.19%	0.19%	0.21%	0.21%	0.21%
40	Expense Inflation Multiplier:		#	1.00	1.11	1.11	1.11	1.11	1.12
41									
42	**Tenant #1 - Triple Net (NNN) Lease:**								
43	% Rentable Square Metres Occupied:		%	41.0%					
44	Rentable Square Metres Occupied:		sq. m.	34,317 sq. m.					
45	Lease Start Date:		Date	2019-04-30					
46	Initial Lease Term (Years):		# Years	3					
47	Lease Expiration Date:		Date	2022-04-30					
48	Initial Lease - Annual Rental Escalation:		%	2.25%	=IF(AND(BM$35>$E45,BN$35<$E47,MONTH(BM$35)=MONTH($E45)),$E48,0)				
49	Initial Lease - Rent-Free Months:		#	6					

   What is the PROBLEM with this formula?

   a. It's incorrectly comparing the month of the lease start date, E45, to the previous month, BM35, rather than the current month, BN35.

   b. It does not handle the case when the lease is first starting and there's no escalation in the first year.

c. It does not handle the case when the lease is expiring and there's no escalation in its final month.

d. None of the above – this formula is correct.

2. **Continuing on with the same model and schedule shown above, you are now reviewing the formulas for the Escalated Rents, i.e., Base Rents, paid by tenants in the initial, renewal, and non-renewal cases. The formula in the non-renewal case is shown below:**

			CK	CL	CM	CN	CO	CP	CQ	CR
Monthly Projections - Construction and Lease-Up Period										
(£ in GBP as Stated)										
Rent Roll:	Units:		Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22
Monthly Change in Market Rental Rates:	%		0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%
Expense Inflation:	%		0.21%	0.21%	0.21%	0.21%	0.21%	0.21%	0.21%	0.21%
Expense Inflation Multiplier:	#	1.00	1.17	1.17	1.17	1.17	1.18	1.18	1.18	1.18
Tenant #1 - Triple Net (NNN) Lease:										
% Rentable Square Metres Occupied:	%	41.0%								
Rentable Square Metres Occupied:	sq. m.	34,317 sq. m.								
Lease Start Date:	Date	2019-04-30								
Initial Lease Term (Years):	# Years	3								
Lease Expiration Date:	Date	2022-04-30								
Initial Lease - Annual Rental Escalation:	%	2.25%	-	-	-	-	-	-	-	-
Initial Lease - Rent-Free Months:	#	6								
Renewal Lease Start Date:	Date	2022-04-30								
Renewal Lease Term (Years):	# Years	5								
Renewal Lease Expiration Date:	Date	2027-04-30								
Renewal Lease - Annual Rental Escalation:	%	2.50%	-	-	-	-	-	-	-	-
New Lease Start Date:	Date	2023-01-31								
New Lease Term (Years):	# Years	5								
New Lease Expiration Date:	Date	2028-01-31								
New Lease - Annual Rental Escalation:	%	2.50%	-	-	-	-	-	-	-	-
Market Rent per Square Metre per Year:	£ / sq. m. / Yr	£ 850.00	£ 1,067.75	£ 1,070.38	£ 1,073.02	£ 1,075.67	£ 1,078.32	£ 1,080.98	£ 1,083.65	£ 1,086.32 £
Escalated Rent Paid by Initial Tenant:	£ / sq. m. / Yr		1,014.67	-	-	-	-	-	-	-
Escalated Rent Paid by Initial Tenant - Renewal:	£ / sq. m. / Yr	-		1,070.38	1,070.38	1,070.38	1,070.38	1,070.38	1,070.38	1,070.38
Escalated Rent Paid by New Tenant:	£ / sq. m. / Yr	-		=IF(CL$35=EOMONTH($E56,1),CL61,IF(CL$35>EOMONTH($E56,1),CK64*(1+CL59),IF(AND(CL$35>$E47,CL$35<=$E56),CL61,0)))						

This formula is similar to the ones in the initial and renewal cases, but it's not exactly the same.

Besides the different dates and the different escalation percentages, what is the MOST IMPORTANT DIFFERENCE in this formula for the non-renewal case?

a. We do not need to check if we're exactly in between the New Lease Start Date and New Lease Expiration Date here because the schedule is constrained to only 1 lease expiration per tenant.

b. During the Downtime period in this case, the Escalated Rent equals the Market Rent (so it can later be reversed in the Absorption & Turnover Vacancy line).

c. We need to check that the current month is 1 month *after* the lease start date here due to the Downtime period; in the other cases, we just check that the current month is sometime after the lease start date.

d. In this case, the first rental escalation always occurs *1 year* after the initial lease has expired, but in the renewal case, it's *1 month* after the initial lease has expired.

3. Continuing with the same schedule, the formula for Concessions & Free Rent, which includes the initial, renewal, and non-renewal cases in the same cell, is shown below:

		CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT
Monthly Projections - Construction and Lease-Up Period											
(£ in GBP as Stated)											
Rent Roll:	**Units:**	**Apr-22**	**May-22**	**Jun-22**	**Jul-22**	**Aug-22**	**Sep-22**	**Oct-22**	**Nov-22**	**Dec-22**	**Jan-23**
Monthly Change in Market Rental Rates:	%	0.80%	0.41%	0.41%	0.41%	0.41%	0.41%	0.41%	0.41%	0.41%	0.41%
Expense Inflation:	%	0.14%	0.17%	0.17%	0.17%	0.17%	0.17%	0.17%	0.17%	0.17%	0.17%
Expense Inflation Multiplier:	#	1.12	1.12	1.12	1.12	1.13	1.13	1.13	1.13	1.13	1.13
Tenant #1 - Triple Net (NNN) Lease:											
% Rentable Square Metres Occupied:	%										
Rentable Square Metres Occupied:	sq. m.										
Lease Start Date:	Date										
Initial Lease Term (Years):	# Years										
Lease Expiration Date:	Date										
Initial Lease - Annual Rental Escalation:	%	-	-	-	-	-	-	-	-	-	-
Initial Lease - Rent-Free Months:	#										
(+) Base Rental Income - Initial Tenant:	£	2,530,248	-	-	-	-	-	-	-	-	-
(+) Base Rental Income - Initial Tenant Renewal:	£	-	1,054,989	1,054,989	1,054,989	1,054,989	1,054,989	1,054,989	1,054,989	1,054,989	1,054,989
(+) Base Rental Income - New Tenant:	£	-	1,582,484	1,588,931	1,595,405	1,601,904	1,608,431	1,614,984	1,621,563	1,628,170	1,634,803
(-) Absorption & Turnover Vacancy:	£	-	(1,582,484)	(1,588,931)	(1,595,405)	(1,601,904)	(1,608,431)	(1,614,984)	(1,621,563)	(1,628,170)	(1,634,803)
(-) Concessions & Free Rent:	£	-	=IF(AND(CL$35>$E45,CL$35<=EOMONTH($E45,$E49)),-CL66,0)+IF(AND(CL$35>$E47,CL$35<=EOMONTH($E47,Renewal_Free_Rent_Months)),-CL67,0)+IF(AND(								
(-) Tenant Improvements (TIs):	£	-	CL$35>$E47,CL$35<=EOMONTH($E47,New_Free_Rent_Months)),-CL68,0)								

Additional cell details (column E values): % Rentable Square Metres Occupied 41.0%; Rentable Square Metres Occupied 34,317 sq. m.; Lease Start Date 2019-04-30; Initial Lease Term 3; Lease Expiration Date 2022-04-30; Initial Lease - Annual Rental Escalation 1.00%; Initial Lease - Rent-Free Months 6; Expense Inflation Multiplier 1.00.

What is the PROBLEM with this formula?

a. This formula does not handle the Rent-Free Months in the renewal case correctly because it reverses the Base Rental Income rather than the Market Rent.

b. This formula assumes that if the tenant renews its lease, the Rent-Free Months happen immediately after, which may or may not be the case.

c. This formula does not factor in the Downtime period that usually follows lease expiration in the non-renewal case.

d. There is no problem – this formula is correct.

4. **Continuing with the same development model, you are now reviewing the Waterfall Returns Schedule in different cases.**

   The cash flows are split 87.5% / 12.5% between the Investor and Developers up to a 15% Total Equity IRR, 77.5% / 22.5% between a 15% Total Equity IRR and 2x Total Equity Multiple, and 67.5% / 32.5% above a 2x Total Equity Multiple.

   A screenshot of the EXIT MONTH in this model is shown below:

Waterfall Returns Schedule:	Units:		Mar-21	Apr-21	May-21	Jun-21	Jul-21
Cash Flow to Equity Investors:							
(-) Invested Equity:	£		£ -	£ -	£ -	£ -	£ -
(+) Net Cash Flow After Debt Service:	£		324,185	320,845	425,818	3,267,419	670,443,321
Total Cash Flow to Equity Investors:	£		**324,185**	**320,845**	**425,818**	**3,267,419**	**670,443,321**
Tier 1 - Up to 15.0% IRR:							
(+) Beginning Balance:	£		622,019,130	628,981,848	636,029,473	643,054,687	647,320,601
(+) Investor Injections:	£		-	-	-	-	-
(+) Investor Accruals:	£	15.0%	7,286,902	7,368,470	7,451,032	7,533,332	7,583,307
(-) Tier 1 Accrual Distribution:	£		(324,185)	(320,845)	(425,818)	(3,267,419)	(654,903,908)
Ending Balance:	£		**628,981,848**	**636,029,473**	**643,054,687**	**647,320,601**	**-**
Investor Cash Flow:	£	87.5%	283,661	280,739	372,591	2,858,991	573,040,919
Developer Cash Flow:	£	12.5%	40,523	40,106	53,227	408,427	81,862,988
Cash Flow Available for Tier 2 Distribution:	£		-	-	-	-	15,539,413
Tier 2 - 15.0% IRR to 2.0x Multiple:							
(+) Beginning Balance:	£		697,376,731	697,052,547	696,731,702	696,305,883	693,038,464
(+) Investor Injections:	£		-	-	-	-	-
(+) Investor Accruals:	£	2.00 x	-	-	-	-	-
(-) Tier 1 Accrual Distribution:	£		(324,185)	(320,845)	(425,818)	(3,267,419)	(654,903,908)
(-) Tier 2 Accrual Distribution:	£		-	-	-	-	(15,539,413)
Ending Balance:	£		**697,052,547**	**696,731,702**	**696,305,883**	**693,038,464**	**22,595,143**
Investor Cash Flow:	£	77.5%	-	-	-	-	12,043,045
Developer Cash Flow:	£	22.5%	-	-	-	-	3,496,368
Cash Flow Available for Tier 3 Distribution:	£		-	-	-	-	-

The "Ending Balance" is 0 in Tier 1, but positive in Tier 2. What does this result mean?

a. The Total Equity IRR is above 15%, but the Total Equity Multiple is below 2x.

b. It doesn't have a specific meaning since this is a mixed IRR and multiple-based Waterfall Schedule, where the returns might not fall within these ranges.

c. If we deleted the Tier 1 Accrual Distribution from Tier 2, this result would mean that the Total Equity IRR is above 15% but the Total Equity Multiple is below 2x.

d. The Total Equity IRR is above 15%, but there is insufficient cash flow for the Investor and Developer to earn 2x multiples because of the Preferred Return earlier on.

e. We can't say anything because it appears that this schedule is set up incorrectly – the Investor Accruals is positive each month in Tier 1, but 0 each month in Tier 2.

5. **This same Waterfall Returns Schedule also includes a "Lookback Provision," which states that if the Investor does not earn at least a 20% IRR, but the Developers do, then the Developers must redistribute their proceeds to the Investor until the Investor earns a 20% IRR, or as high an IRR as possible with the proceeds available.**

The VBA code for this Lookback function, which is based on named cells and named ranges in the Excel file, is shown below:

```vba
Sub Lookback()
'
' Macro1 Macro
'
' Keyboard Shortcut: Ctrl+Shift+L
'
    Dim LookbackAmount
    Dim DevProceedsOnExit
    Dim LookbackCell
    Dim DevProceedsCell

    [Lookback_Range].ClearContents

    If [Investor_IRR].Value < [Investor_Lookback_IRR].Value And [Developer_IRR].Value > [Investor_Lookback_IRR].Value Then

        Set LookbackCell = WorksheetFunction.Index([Returns_Full_Range], [Returns_Full_Range].Rows.Count, WorksheetFunction.Match([Exit_Date], [Returns_Date_Range], 0))
        Set DevProceedsCell = WorksheetFunction.Index([Returns_Full_Range], [Returns_Full_Range].Rows.Count - 6, WorksheetFunction.Match([Exit_Date], [Returns_Date_Range], 0))

        [Investor_IRR].GoalSeek _
            Goal:=[Investor_Lookback_IRR].Value, _
            ChangingCell:=LookbackCell

        LookbackAmount = LookbackCell.Value
        DevProceedsOnExit = DevProceedsCell.Value

        LookbackCell.Value = DevProceedsOnExit

    End If
End Sub
```

What is the PROBLEM with this function that could cause it to work incorrectly in specific cases?

a. In the beginning, we should not clear the applicable range of cells ("Lookback_Range") because doing so will remove the required data.

b. We need to check if the Investor and Developer IRRs have been calculated before we use the .Value command – otherwise, we could get an error with the "<" and ">" operators.

c. We are not checking for the case where the Developer Proceeds On Exit are negative rather than positive or 0.

d. We are not checking for the case where the required Lookback is greater than the Developer Proceeds On Exit, in which case we cannot redistribute the full Lookback amount.

e. None of the above – this function is correct.

6. **You calculate the returns to the Mezzanine Investors in this deal (10% Mezzanine LTV and 60% Senior Loan LTV when the refinancing takes place upon construction completion), and you get the following results for the IRRs:**

Mezzanine IRR - Exit Cap Rate and Operating Scenario:

Operating Scenario:	Exit Prime Office Yield (Exit Date of May 21):								
	4.00%	4.20%	4.40%	4.60%	**4.80%**	5.00%	5.20%	5.40%	**5.60%**
Upside	**12.3%**	12.0%	11.7%	11.5%	11.2%	11.0%	10.9%	10.7%	10.5%
Base	13.5%	13.2%	12.8%	12.6%	**12.3%**	12.0%	11.8%	11.6%	11.4%
Downside	15.2%	14.7%	14.4%	14.0%	13.7%	13.4%	13.1%	12.9%	**12.6%**

How is it possible for the Mezzanine Investors to earn the *highest* IRRs in the Downside Case of the model?

a. This should never happen, so it indicates that the operational assumptions are wrong or the model is set up incorrectly.

b. It's possible if there's an Equity Grant to the Mezzanine Investors and the property value upon permanent loan refinancing is much lower in the Downside Case.

c. It's possible if the Mezzanine Interest is 100% Paid-In-Kind (PIK) or Accrued, meaning that the returns are far more dependent on the exit.

d. It's possible because of the Prepayment Penalty – if the exit occurs before the Mezzanine Maturity, the Mezzanine Investors will earn more.

e. It's possible if there's insufficient cash flow to pay for the Prepayment Penalty and other exit fees in the Base and Upside Cases, but not in the Downside Case.

7. **The returns sensitivities for the Equity Investor and Developers are shown below. Based on these tables, what might you recommend to improve this deal's performance?**

Investor IRR - Exit Cap Rate and Operating Scenario:

Operating Scenario:	Exit Prime Office Yield (Exit Date of May 21):								
	4.00%	4.20%	4.40%	4.60%	4.80%	5.00%	5.20%	5.40%	5.60%
Upside	28.2%	26.8%	25.5%	24.2%	23.0%	21.8%	20.6%	19.4%	18.1%
Base	25.1%	23.7%	22.4%	21.2%	20.0%	18.8%	17.7%	16.4%	15.0%
Downside	18.4%	17.1%	15.6%	14.1%	12.6%	11.2%	9.8%	8.4%	7.1%

Developer IRR - Exit Cap Rate and Operating Scenario:

Operating Scenario:	Exit Prime Office Yield (Exit Date of May 21):								
	4.00%	4.20%	4.40%	4.60%	4.80%	5.00%	5.20%	5.40%	5.60%
Upside	34.6%	30.7%	26.7%	22.4%	17.5%	11.9%	5.0%	(2.2%)	#NUM!
Base	29.0%	24.9%	20.5%	15.6%	10.2%	3.7%	(3.7%)	(9.9%)	0.0%
Downside	7.4%	0.1%	(3.9%)	(7.4%)	0.0%	0.0%	0.0%	0.0%	0.0%

Investor IRR - Exit Date and Operating Scenario:

Operating Scenario:	Exit Date:											
	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22
Upside	28.2%	26.8%	25.4%	24.0%	22.6%	21.2%	20.7%	20.3%	19.8%	19.3%	18.9%	18.4%
Base	20.0%	18.7%	17.3%	15.6%	13.8%	11.9%	10.0%	7.9%	6.7%	5.9%	5.1%	4.2%
Downside	7.1%	5.4%	3.6%	1.8%	(0.1%)	(2.2%)	(4.4%)	(6.8%)	0.0%	0.0%	0.0%	0.0%

Developer IRR - Exit Date and Operating Scenario:

Operating Scenario:	Exit Date:											
	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22
Upside	34.6%	30.9%	27.1%	22.8%	18.0%	12.2%	10.2%	8.2%	6.1%	3.8%	1.4%	(0.7%)
Base	10.2%	3.5%	(4.4%)	(9.3%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Downside	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

a. Exit as early as possible, or sell off the Equity stake gradually, starting in an earlier month.

b. Negotiate to remove the Lookback Provision if it will result in higher IRRs for the Developers in the Downside Case.

c. Negotiate for longer-term leases with tenants to make the property's NOI more stable over time, especially in the Downside Case – even if it means higher Concessions or lower rental escalations.

d. Use a lower Permanent Loan LTV for the deal, which will reduce the IRRs in the Base and Upside Cases but boost them in the Downside Case.

e. All of the above.