CIPFA The Chartered Institute of Public Finance & Accountancy

Strategic Case Study D21 paper

Mathematical Computation to Questions

Capital Cost of Buying properties and loan repayments

USE THE FOLLOWING TO FLEX THIS SHEET:				
VARIABLE INPUT		CALCULATIONS	REFERRED CELL	MARKS GIVEN FOR CALCULATIONS
Ok to Touch		Don't Touch	Don't Touch	Don't Touch

A. Buying houses for sale on estates

	No of dwellings	Average Purchase Price each	Renovation/ Connection to services each	Total Cost	No Bedrooms per dwelling	Total No bedroom	Cost per bedroom
		£000	£000	£000			£000
Estate 1							
2 Bedroom	5	120	10	650	2	10	65
3 Bedroom	8	150	15	1,320	3	24	55
Estate 2							
2 Bedroom	6	115	12	762	2	12	64
3 Bedroom	4	145	25	680	3	12	57
Estate 3							
2 Bedroom	9	125	20	1,305	2	18	73
3 Bedroom	3	160	15	525	3	9	58
Total	35			5,242		85	
Average		136	16.17	150		2.43	62

Excel PMT Function (rate,nper,pv) formula; PMT calculates the payment for a loan based on constant payments and a constant interest rate	Present value of loan	Monthly Rate ie Annual/12	Number of payments
	PV	Rate	Nper
Monthly (for info)	5,242,000	0.19%	300
Annual	5,242,000	2.25%	25
FORMULA	Annual	Monthly for info	
	(276,442)	(22,862)	
Total Repayment	(6,911,051)	(6,858,591)	
EQUATION			
	276,442	22,862	
Total Repayment	6,911,051	6,858,591	

The ANNUAL equation is: `P = (Pv*R) / [1 - (1 + R)^(-n)]`

where

P = Annual Payment
Pv = Present Value (starting value of the loan)
R = Annual Percentage Rate
n = Total number of interest periods ie number of years

The MONTHLY equation is: `P = (Pv*R) / [1 - (1 + R)^(-n)]`
where
P = Monthly Payment
Pv = Present Value (starting value of the loan)
APR = Annual Percentage Rate
R = Periodic Interest Rate = APR/number of interest periods per year
n = Total number of interest periods (interest periods per year * number of years)

B. Use of modular build - prefabricated construction

	No of dwellings	Average Purchase Price each	Renovation/ Connection to services each	Total Cost	No Bedrooms per dwelling	Total No bedroom	Cost per bedroom
		£000	£000	£000			£000
1 Bedroom	25	65	20	2,125	1	25	85
2 Bedroom	25	90	25	2,875	2	50	58
Total	50	155	45	5,000		75	
Average				100		1.5	67

Monthly	5,000,000	0.001875	300
Annual	5,000,000	0.0225	25
FORMULA	Annual	Monthly for info	
	(263,680)	(21,807)	
Total Repayment	(6,591,999)	(6,541,960)	
EQUATION			
	263,680	21,807	
Total Repayment	6,591,999	6,541,960	

C. Conversion of disused industrial warehousing site

			No of dwellings	Average Purchase Price each	Renovation/ Connection to services each	Total Cost	No Bedrooms per dwelling	Total No bedroom	Cost per bedroom
Value	6250	Old Plate Warehouse		£000	£000	£000			£000
2	2500	1 Bedroom	15	100	30	1,950	1	15	130
3	3750	2 Bedroom	20	125	40	3,300	2	40	83
5 Ratio									
		Total	35			5,250		55	
		Average		56	17.5	150		1.57	95

Monthly	5,250,000	0.001875	300
Annual	5,250,000	0.0225	25
FORMULA	Annual	Monthly for info	
	(276,864)	(22,897)	
Total Repayment	(6,921,599)	(6,869,058)	
EQUATION			
	276,864	22,897	
Total Repayment	6,921,599	6,869,058	

Likely rent income to service loan repayments - based on 50 week year

A. Buying houses for sale on estates

	No of dwellings	Weekly rent each £	No weeks per annum 50	Total Annual Rent Income £	Estimated Annual Loan Repayments	Surplus/Deficit	
Estate 1							
2 Bedroom	5	175	50	43,750			
3 Bedroom	8	200	50	80,000			
Estate 2							
2 Bedroom	6	175	50	52,500			
3 Bedroom	4	200	50	40,000			
Estate 3							
2 Bedroom	9	175	50	78,750			
3 Bedroom	3	200	50	30,000			
Total	35			325,000	276,442	48,558	SURPLUS
Average		188					
LESS contributions to:							
Maintenance	7.5%			24,375			
Overhead	5.0%			16,250			
Total Oncost				40,625			
			Net Rent Income	284,375	276,442	7,933	SURPLUS

B. Use of modular build - prefabricated construction

1 Bedroom	25	100	50	125,000			
2 Bedroom	25	115	50	143,750			
Total	50			268,750	263,680	5,070	SURPLUS
Average		108					
LESS contributions to:							
Maintenance	7.5%			20,156			
Overhead	5.0%			13,438			
Total Oncost				33,594			
			Net Rent Income	235,156	263,680	(28,524)	DEFICIT

C. Conversion of disused industrial warehousing site

Value	6250	Old Plate Warehouse						
2	2500	1 Bedroom	15	160	50	120,000		
3	3750	2 Bedroom	20	190	50	190,000		
5 Ratio								
		Total	35			310,000	276,864	33,136	SURPLUS
		Average		175					
		LESS contributions to:							
		Maintenance	7.5%			23,250			
		Overhead	5.0%			15,500			
		Total Oncost				38,750			
					Net Rent Income	271,250	276,864	(5,614)	DEFICIT

Likely rent income to service loan repayments - based on 52 week year

1. Buying houses for sale on estates

	No of dwellings	Weekly rent each £	No weeks per annum 52	Total Annual Rent Income £	Estimated Annual Loan Repayments	Surplus/Deficit	
Estate 1							
2 Bedroom	5	175	52	45,500			
3 Bedroom	8	200	52	83,200			
Estate 2							
2 Bedroom	6	175	52	54,600			
3 Bedroom	4	200	52	41,600			
Estate 3							
2 Bedroom	9	175	52	81,900			
3 Bedroom	3	200	52	31,200			
Total	35			338,000	276,442	61,558	SURPLUS
Average		188					
LESS contributions to:							
Maintenance	7.5%			25,350			
Overhead	5.0%			16,900			
Total Oncost				42,250			
			Net Rent Income	295,750	276,442	19,308	SURPLUS

2. Use of modular build - prefabricated construction

1 Bedroom	25	100	52	130,000			
2 Bedroom	25	115	52	149,500			
Total	50	215	104	279,500	263,680	15,820	SURPLUS
Average							
LESS contributions to:							
Maintenance	7.5%			20,963			
Overhead	5.0%			13,975			
Total Oncost				34,938			
			Net Rent Income	244,563	263,680	(19,117)	DEFICIT

3. Conversion of disused industrial warehousing site

		Old Plate Warehouse						
		1 Bedroom	15	160	52	124,800		
		2 Bedroom	20	190	52	197,600		
		Total	35			322,400	276,864	45,536	SURPLUS
		Average		88	26				
		LESS contributions to:							
		Maintenance	7.5%			24,180			
		Overhead	5.0%			16,120			
		Total Oncost				40,300			
					Net Rent Income	282,100	276,864	5,236	SURPLUS

NB - THESE FIGURES ARE PULLED THROUGH FROM THE OPTIONS TAB

Capital Cost of Buying properties and loan repayments

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C. Conversion of disused industrial warehousing site

			No of dwellings	Average Purchase Price each	Renovation/ Connection to services each	Total Cost	No Bedrooms per dwelling	Total No bedroom	Cost per bedroom
Value	6250	Old Plate Warehouse		£000	£000	£000			£000
2	2500	1 Bedroom	15	100	30	1,950	1	15	130
3	3750	2 Bedroom	20	125	40	3,300	2	40	83
5 Ratio									
		Total	35			5,250		55	
		Average		56	17.5	150		1.57	95

Excel PMT Function (rate,nper,pv) formula; PMT calculates the payment for a loan based on constant payments and a constant interest rate	**Present value of loan** PV	**Monthly Rate ie Annual/12** Rate	**Number of payments** Nper
Monthly	5,250,000	0.19%	300
Annual	5,250,000	2.25%	25

FORMULA	Annual	Monthly for info
	(276,864)	(22,897)
Total Repayment	(6,921,599)	(6,869,058)
EQUATION		
	276,864	22,897
Total Repayment	6,921,599	6,869,058

The ANNUAL equation is: `P = (Pv*R) / [1 - (1 + R)^(-n)]`

where
P = Annual Payment

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Likely rent income to service loan repayments - based on 50 week year

C. Conversion of disused industrial warehousing site

			No of dwellings	Weekly rent each £	No weeks per annum	Total Annual Rent income £	Estimated Annual Loan Repayments	Surplus/Deficit	
Value	6250	Old Plate Warehouse							
2	2500	1 Bedroom	15	160	50	120,000			
3	3750	2 Bedroom	20	190	50	190,000			
5 Ratio									
		Total	35			310,000	276,864	33,136	SURPLUS
		Average		175					
		LESS contributions to:							
		Maintenance	7.5%			23,250			
		Overhead	5.0%			15,500			
		Total Oncost				38,750			
					Net Rent Income	271,250	276,864	(5,614)	DEFICIT

Likely rent income to service loan repayments - based on 52 week year

1. Buying houses for sale on estates

3. Conversion of disused industrial warehousing site

		No of dwellings	Weekly rent each £	No weeks per annum	Total Annual Rent income £	Estimated Annual Loan Repayments	Surplus/Deficit	
	Old Plate Warehouse							
	1 Bedroom	15	160	52	124,800			
	2 Bedroom	20	190	52	197,600			
	To	35			322,400	276,864	45,536	SURPLUS
	Average		88	26				
	LESS contributions to:							
	Maintenance	7.5%			24,180			
	Overhead	5.0%			16,120			
	Total Oncost				40,300			
				Net Rent Income	282,100	276,864	5,236	SURPLUS