



GENERAL MATHEMATICS 2024

Unit 3

Key Topic Test 8 – Recursion and Financial Modelling: Compound Interest Investments and Loans with Periodic Payments

Recommended writing time*: 45 minutes

Total number of marks available: 25 marks

SOLUTIONS

SECTION A – Multiple Choice (1 mark per question)

Question 1

Answer: E

Finance Solver	
N:	78.
I(%):	5.2
PV:	420000
Pmt:	-2550
FV:	-352427.21312437
PpY:	12

Question 2

Answer: C

Finance Solver	
N:	289.2720522741
I(%):	5.2
PV:	420000
Pmt:	-2550
FV:	0
PpY:	12

Must round this up to 290 payments

Question 3

Answer: C

Finance Solver	
N:	290
I(%):	5.2
PV:	420000
Pmt:	-2550
FV:	1855.174536467
PpY:	12

$$2550 - 1855.17 = \$694.83$$

Question 4

Answer: A

$$1 + \frac{6.8}{400} = 1.017$$

$$V_0 = 55\,000, V_{n+1} = 1.017 \times V_n + 3000$$

Question 5

Answer: C

$$1 + \frac{x}{1200} = 1.0035$$

$$x = 4.2$$

4.2% per annum hence 4.1% is not correct.

SECTION B – Short Answer

Question 1

a. \$1200

1 mark

b. $1.009 = 1 + \frac{x}{1200}$

$x = 10.8\%$

1 mark

c. $P_1 = 1.009 \times 725000 + 1200 = 732\,725$
 $P_2 = 1.009 \times 732\,725 + 1200 = 740\,519.53$
 $P_3 = 1.009 \times 740\,519.73 + 1200 = \$748\,384.20$

2 marks

d. $Int = 748384.20 - 725000 - 1200 \times 3$
 $= \$19\,784$

2 marks

e.

Finance Solver	
N:	12
I(%):	10.8
PV:	-725000
Pmt:	-1200
FV:	822429.13767114
PpY:	12

After 12 months the investment is worth \$822 429.14

1 mark

Finance Solver	
N:	179.98437513348
I(%):	10.8
PV:	-822429.14
Pmt:	9245
FV:	0
PpY:	12

The retirement fund will last for 180 months (15 years)

2 marks

Total 9 marks

Question 2

a. \$4878.90

Finance Solver	
N:	300
I(%):	6.66
PV:	712000
Pmt:	-4878.90146119
FV:	0
PpY:	12

2 marks

b. \$646 192.87

Finance Solver	
N:	60
I(%):	6.66
PV:	712000
Pmt:	-4878.9
FV:	-646192.87412442
PpY:	12

2 marks

c. $J_0 = 712\,000$, $J_{n+1} = 1.00555 \times J_n - 4878.90$

2 marks

d. 25 years of \$4878.90

Finance Solver	
N:	300
I(%):	6.66
PV:	712000
Pmt:	-4878.9
FV:	-1.121929931
PpY:	12

Loan is still owed \$1.12

Final payment = $4878.90 + 1.12$
 = \$4880.02

2 marks

- e. Balance after 15 years

Finance Solver	
N:	180
I(%):	6.66
PV:	712000
Pmt:	-4878.9
FV:	-426613.00987799
PpY:	12

Finance Solver	
N:	114.3186654123
I(%):	6.66
PV:	426613.01
Pmt:	-5050
FV:	0
PpY:	12

Finance Solver info star

Total payments = $180 + 115 = 295$
 Jasmine repays the loan 5 months earlier.

1 mark

- f. 180 payments of 4878.90
 114 payments of \$5050
 1 payment of \$1612.30
 Total = \$1 455 514.30
 Interest = \$743 514

2 marks

Total 11 marks

END OF KEY TOPIC TEST SOLUTIONS