GENERAL MATHEMATICS 2024

Unit 3
Key Topic Test 8 – Recursion and Financial Modelling: Compound Interest Investments and Loans with Periodic Payments

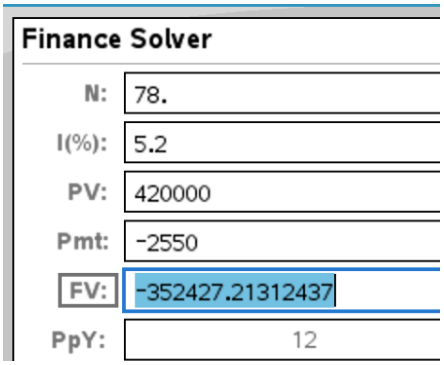
Recommended writing time*: 45 minutes

Total number of marks available: 25 marks

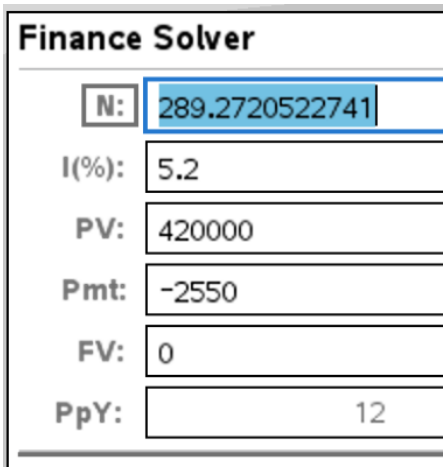
SOLUTIONS

SECTION A – Multiple Choice (1 mark per question)

Question 1
Answer: E

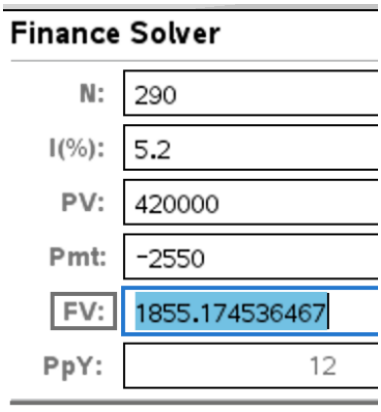


Question 2
Answer: C



Must round this up to 290 payments

Question 3
Answer: C



$2550 - 1855.17 = \$694.83$

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

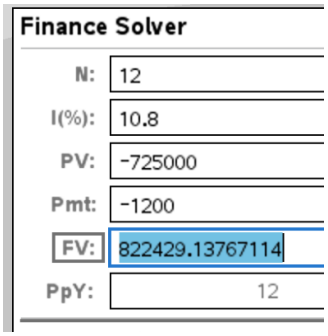
c. $P_1 = 1.009 \times 725000 + 1200 = 732\ 725$
$P_2 = 1.009 \times 732\ 725 + 1200 = 740\ 519.53$
$P_3 = 1.009 \times 740\ 519.73 + 1200 = \$748\ 384.20$

2 marks

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

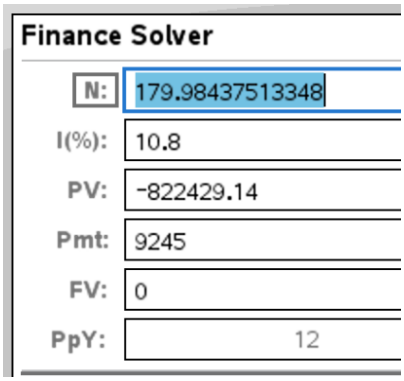
2 marks

e.



After 12 months the investment is worth $822 429.14

1 mark

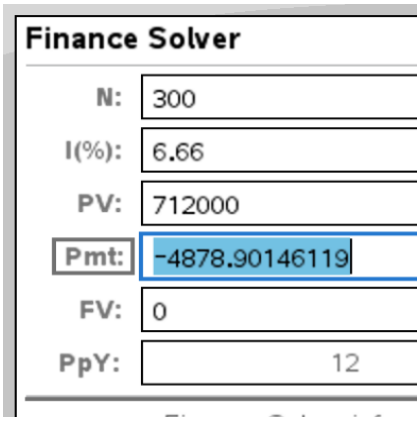


The retirement fund will last for 180 months (15 years)

2 marks
Total 9 marks

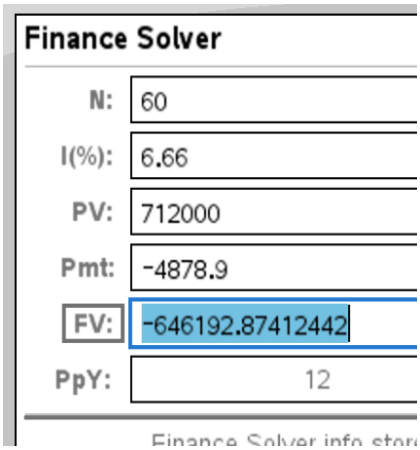
Question 2

a. $4878.90



2 marks

b. $646 192.87

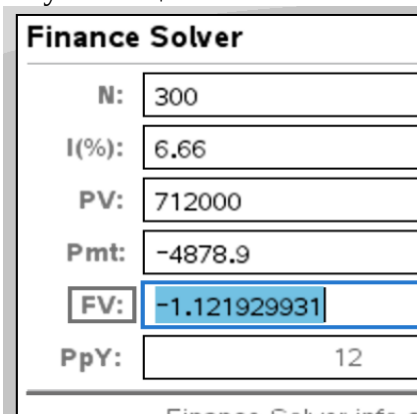


2 marks

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

2 marks

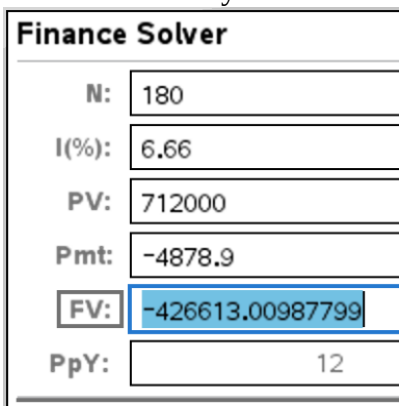
d. 25 years of $4878.90

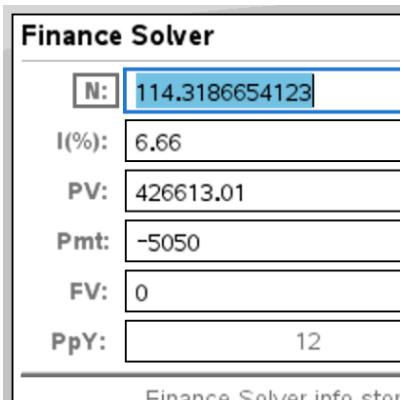


Loan is still owed $1.12
Final payment = 4878.90 + 1.12
= $4880.02

2 marks

e. Balance after 15 years





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