



# **GENERAL MATHEMATICS 2024**

## **Unit 3**

### **Key Topic Test 5 – Recursion and Financial Modelling: Depreciation of assets**

Recommended writing time\*: 45 minutes

Total number of marks available: 25 marks

## **SOLUTIONS**

**SECTION A – Multiple Choice (1 mark per question)**

**Question 1**

*Answer:* C

$$\frac{20}{100} \times 1200 = 240$$

$$V_0 = 1200, V_{n+1} = V_n - 240$$

**Question 2**

*Answer:* D

$$\begin{aligned} V_3 &= 24500 - 3 \times 1450 \\ &= \$20\,150 \end{aligned}$$

**Question 3**

*Answer:* A

$$\begin{aligned} 1.80 \times 840 &= 1512 \\ 4 \times 1512 &= 6048 \end{aligned}$$

$$45000 - 6048 = \$38\,952$$

**Question 4**

*Answer:* E

$$\begin{aligned} 34000 \left(1 - \frac{a}{100}\right)^2 &= 28777.60 \\ a &= 8 \end{aligned}$$

**Question 5**

*Answer:* B

$$\begin{aligned} \frac{4}{100} \times 8200 &= 328 \\ 5 \times 328 &= \$1640 \end{aligned}$$

**SECTION B – Short Answer**

**Question 1**

a.  $V_0 = \$35400$

1 mark

b.  $\left(1 - \frac{r}{100}\right) = 0.946$

$r = 5.4\%$

1 mark

c.  $V_8 = 35400 \times 0.946^8$   
 $= \$22\,705.57$

1 mark

d.  $10000 > 35400 \times 0.946^n$   
 $n > 22.77 \dots$   
 $n = 23 \text{ years}$

2 marks

Total 5 marks

**Question 2**

a.  $\frac{400\,000}{100} = 40000$   
 $4000 \times 0.05 = 200$   
 $2650 - 200 = \$2450$

2 marks

b.  $\frac{600000}{100} \times 0.05 = 300$   
 $1500 > 2650 - n \times 300$   
 $n = 4 \text{ years}$

2 marks

c.  $V_0 = 2650, V_{n+1} = V_n - 132.5$

2 marks

d. Depreciation = \$300 per year

$\frac{r}{100} \times 2650 = 300$

$r = 11.32\%$

3 marks

Total 9 marks

**Question 3****a.**

$n$	0	1	2	3
$V_n$	42 000	<b>36 960</b>	<b>32 524.80</b>	<b>28 621.82</b>

2 marks

**b.**  $V_n = 42\,000 \times 0.88^n$

1 mark

**c.** 12%

1 mark

**d.**  $14000 > 42\,000 \times 0.88^n$

$n > 8.59 \dots$

$n = 9 \text{ years}$

2 marks

Total 6 marks

**END OF KEY TOPIC TEST SOLUTIONS**