

# Mark Scheme - Math AISL Paper 2 (May 2026)

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## Question 1

(a) Compound interest formula:  $A = P(1 + r/n)^{nt}$ .  $P=14500$ ,  $r=0.023$ ,  $n=12$ ,  $t=3$ .  $A = 14500(1 + 0.023/12)^{36} \approx 15556.55$  GBP.

(b) Using the TVM solver (or annuity formula): Principal = 15556.55, PMT = -250,  $n=12$ ,  $t=2$ . Balance  $\approx 21966.36$  GBP.

(c) (i) Arithmetic sequence:  $u_n = u_1 + (n-1)d$ .  $u_1 = 28492$ ,  $u_2 = 26616$ .  $d = 26616 - 28492 = -1876$ .

Formula:  $u_n = 28492 + (n-1)(-1876) = 30368 - 1876n$ .

(ii) For  $n=7$ :  $u_7 = 30368 - 1876(7) = 17236$  GBP.

(iii) Limitations: The linear model is not realistic for old cars; costs do not decrease indefinitely; market value changes are not always constant.

## Question 2

(a) Using GDC: (i) Active: Mean  $\approx 119.75$ , SD  $\approx 8.65$ . (ii) Non-active: Mean  $\approx 131.5$ , SD  $\approx 8.65$ .

(c) (i)  $H_0: \mu_A = \mu_N$  (ii)  $H_1: \mu_A < \mu_N$ .

(f) (i) Regression line: Use GDC with given data.  $y = 0.945x + 98.7$  (approx). (ii)  $r \approx 0.887$ .

## Question 3

(a) Period = 24.  $2\pi/b = 24 \rightarrow b = \pi/12 \approx 0.262$ .

(b) (i) Substitute  $t=18$ :  $36.9 = a \sin(18\pi/12) + c = a \sin(1.5\pi) + c = -a + c$ .

(ii) Substitute  $t=13$ :  $36.6 = a \sin(13\pi/12) + c$ .

## Question 4

(a)  $P = 0.245\pi(40)^2(10)^3 = 0.245\pi(1600)(1000) \approx 1.23 \times 10^9$ .

(b) (i) Category 6:  $10.8 \leq v \leq 13.8$ . Substitute  $v=10.8$  into  $P = 0.245\pi(40)^2v^3 \approx 1.53 \times 10^6$ .

## Question 5

(a) (i) Arc length  $x = 2\pi r(\theta/360)$  with  $r=9$ .  $x = 18\pi(\theta/360) = \pi\theta/20$ .

(ii) Remaining arc length =  $18\pi - \pi\theta/20$ .

(b) Circumference of cone base =  $2\pi r_c$  = remaining arc length.  $2\pi r_c = 18\pi - \pi\theta/20$ . Solving for  $r_c$  leads to the expression.

(c) Volume of cone  $V = (1/3)\pi r_c^2 h$ . Using Pythagorean theorem,  $h^2 + r_c^2 = 9^2$ .