

Question Number	Scheme	Marks
7.	(a) (i) $t_{58} = a + 57d$	B1
	(ii) $S_{13} = \frac{13}{2}(2a + 12d)$	B1
	(b) $a + 57d = \frac{13}{2}(2a + 12d)$	M1
	$-12a = 21d$	A1
	$d = -\frac{4}{7}a$	
	(c) $t_{176} = a + 175d = a + 175(-\frac{4}{7}a)$ OR	M1
	$S_{21} = \frac{21}{2}(2a + 20d) = 21a + 210(-\frac{4}{7}a)$	A1
	$= a - 100a = -99a$	M1
	$S_{21} = \frac{21}{2}(2a + 20d) = 21a + 210(-\frac{4}{7}a)$ OR	A1
	$t_{176} = a + 175d = a + 175(-\frac{4}{7}a)$	
	$= 21a - 120a = -99a = t_{176}$	
	(d) $a + (r-1)d = 5(a + 8d)$	M1
	$(r-1)d = 4(-\frac{7}{4}d) + 40d$ or $(r-1)(-\frac{4}{7}a) = 4a + 40(-\frac{4}{7}a)$	
	$r-1 = 33$ or $-4(r-1) = -132$	M1
	$r = 34$	A1 (11)

Notes

Question 7(a)

(i) B1 for any correct expression for t_{58} (simplification not required for this mark)

(ii) B1 for any correct expression for S_{13} (simplification not required for this mark)

(b)

M1 for their $t_{58} =$ their S_{13}

A1 for collecting like terms on either side leading to $d = -\frac{4}{7}a$ cso *

This is a 'show' question so all working must be seen clearly.

(c)

M1 for an expression for t_{176} or S_{21} in either a or d

Substitution must be for the **given** value of d

A1 for $t_{176} = a - 100a = -99a$ or $t_{176} = \frac{693}{4}d$ cso OR $S_{21} = 21a - 120a = -99a$

M1 for an expression for t_{176} or S_{21} in either a or d

Substitution must be for the **given** value of d

A1 for $t_{176} = a - 100a = -99a$ OR $S_{21} = 21a - 120a = -99a = t_{176}$ or $t_{176} = S_{21} = \frac{693}{4}d$ cso **with a**

conclusion

Alternative

M1 for $t_{176} = S_{21}$ using 'their' expressions

A1 for correct unsimplified $t_{176} = S_{21}$

M1 for $-35d = 20a$ oe

A1 for $d = -\frac{4}{7}a$ with a conclusion that must refer to part (b)

(d)

M1 for equating expressions for t_r and $5t_9$ in r , a and d

M1 for an equation in r only (allow for slip ups in algebra for this mark)

A1 $r = 34$ cso