

Let,
 $a = 1^{\text{st}}$ term of arithmetic progression
 $d =$ common difference of arithmetic progression
 $A = 1^{\text{st}}$ term of geometric progression
 $r =$ common ratio of arithmetic progression

Hence,

$$A = a + 6d$$

$$Ar = a + 3d$$

$$Ar^2 = a + d$$

Finds two equations linking 3 variables

$$\text{e.g. } A = a + 6Ar^2 - 6a \text{ and } Ar = a + 3Ar^2 - 3a$$

Eliminates second variable, r must remain

$$\text{e.g. } 5a = 6Ar^2 - A \text{ and } 2a = 3Ar^2 - Ar$$

$$\frac{5a}{2a} = \frac{6Ar^2 - A}{3Ar^2 - Ar}$$

$$\frac{5}{2} = \frac{6Ar^2 - A}{3Ar^2 - Ar}$$

$$\frac{5}{2} = \frac{6Ar^2 - A}{3Ar^2 - Ar}$$

Finds equation in r alone

$$\text{e.g. } \frac{5}{2} = \frac{6r^2 - 1}{3r^2 - r}$$

Begins process to solve

$$\text{e.g. rearranges to quadratic } 3r^2 - 5r + 2 = 0$$

$$r = \frac{2}{3}, r \neq 1$$

$$r = \frac{2}{3}$$

Accept sensible alternative methods

M1

M1

M1

M1

M1

M1 Both must be considered to be awarded

A1 Do not award if $r = 1$ is not ruled out

[7]

[7 marks]