

AS Final Exam : Revision 7 Series

P1 June 08

- 3 (i) Find the first 3 terms in the expansion, in ascending powers of x , of $(2 + x^2)^5$. [3]
- (ii) Hence find the coefficient of x^4 in the expansion of $(1 + x^2)^2(2 + x^2)^5$. [3]

- 7 The first term of a geometric progression is 81 and the fourth term is 24. Find
- (i) the common ratio of the progression, [2]
- (ii) the sum to infinity of the progression. [2]

The second and third terms of this geometric progression are the first and fourth terms respectively of an arithmetic progression.

- (iii) Find the sum of the first ten terms of the arithmetic progression. [3]

P1 Nov 08

- 3 (i) Find the first three terms in the expansion of $(2 + u)^5$ in ascending powers of u . [3]
- (ii) Use the substitution $u = x + x^2$ in your answer to part (i) to find the coefficient of x^2 in the expansion of $(2 + x + x^2)^5$. [2]

- 4 The 1st term of an arithmetic progression is a and the common difference is d , where $d \neq 0$.

- (i) Write down expressions, in terms of a and d , for the 5th term and the 15th term. [1]

The 1st term, the 5th term and the 15th term of the arithmetic progression are the first three terms of a geometric progression.

- (ii) Show that $3a = 8d$. [3]

- (iii) Find the common ratio of the geometric progression. [2]

P1 June 07

- 7 The second term of a geometric progression is 3 and the sum to infinity is 12.
- (i) Find the first term of the progression. [4]

An arithmetic progression has the same first and second terms as the geometric progression.

- (ii) Find the sum of the first 20 terms of the arithmetic progression. [3]

P1 Nov 07

- 3 (i) Find the first three terms in the expansion of $(2 + u)^5$ in ascending powers of u . [3]
- (ii) Use the substitution $u = x + x^2$ in your answer to part (i) to find the coefficient of x^2 in the expansion of $(2 + x + x^2)^5$. [2]

P1 Nov 07

- 4 The 1st term of an arithmetic progression is a and the common difference is d , where $d \neq 0$.

(i) Write down expressions, in terms of a and d , for the 5th term and the 15th term. [1]

The 1st term, the 5th term and the 15th term of the arithmetic progression are the first three terms of a geometric progression.

(ii) Show that $3a = 8d$. [3]

(iii) Find the common ratio of the geometric progression. [2]

P1 June 06

- 3 Each year a company gives a grant to a charity. The amount given each year increases by 5% of its value in the preceding year. The grant in 2001 was \$5000. Find

(i) the grant given in 2011, [3]

(ii) the total amount of money given to the charity during the years 2001 to 2011 inclusive. [2]

- 4 The first three terms in the expansion of $(2 + ax)^n$, in ascending powers of x , are $32 - 40x + bx^2$. Find the values of the constants n , a and b . [5]

P1 Nov 06

- 1 Find the coefficient of x^2 in the expansion of $\left(x + \frac{2}{x}\right)^6$. [3]

- 6 (a) Find the sum of all the integers between 100 and 400 that are divisible by 7. [4]

(b) The first three terms in a geometric progression are 144, x and 64 respectively, where x is positive. Find

(i) the value of x ,

(ii) the sum to infinity of the progression.

[5]

P1 June 05

- 4 (i) Find the first 3 terms in the expansion of $(2 - x)^6$ in ascending powers of x . [3]

(ii) Find the value of k for which there is no term in x^2 in the expansion of $(1 + kx)(2 - x)^6$. [2]

- 6 A geometric progression has 6 terms. The first term is 192 and the common ratio is 1.5. An arithmetic progression has 21 terms and common difference 1.5. Given that the sum of all the terms in the geometric progression is equal to the sum of all the terms in the arithmetic progression, find the first term and the last term of the arithmetic progression. [6]

P1 Nov 05

- 6 A small trading company made a profit of \$250 000 in the year 2000. The company considered two different plans, plan *A* and plan *B*, for increasing its profits.

Under plan *A*, the annual profit would increase each year by 5% of its value in the preceding year. Find, for plan *A*,

- (i) the profit for the year 2008, [3]
- (ii) the total profit for the 10 years 2000 to 2009 inclusive. [2]

Under plan *B*, the annual profit would increase each year by a constant amount \$*D*.

- (iii) Find the value of *D* for which the total profit for the 10 years 2000 to 2009 inclusive would be the same for both plans. [3]

P1 June 04

- 1 A geometric progression has first term 64 and sum to infinity 256. Find

- (i) the common ratio, [2]
- (ii) the sum of the first ten terms. [2]

- 4 Find the coefficient of x^3 in the expansion of

- (i) $(1 + 2x)^6$, [3]
- (ii) $(1 - 3x)(1 + 2x)^6$. [3]

P1 Nov 04

- 1 Find the coefficient of x in the expansion of $\left(3x - \frac{2}{x}\right)^5$. [4]

- 2 Find

- (i) the sum of the first ten terms of the geometric progression 81, 54, 36, ..., [3]
- (ii) the sum of all the terms in the arithmetic progression 180, 175, 170, ..., 25. [3]

P1 June 03

- 1 Find the value of the coefficient of $\frac{1}{x}$ in the expansion of $\left(2x - \frac{1}{x}\right)^5$. [3]

- 4 In an arithmetic progression, the 1st term is -10 , the 15th term is 11 and the last term is 41. Find the sum of all the terms in the progression. [5]

P1 Nov 03

- 3 (a) A debt of \$3726 is repaid by weekly payments which are in arithmetic progression. The first payment is \$60 and the debt is fully repaid after 48 weeks. Find the third payment. [3]
- (b) Find the sum to infinity of the geometric progression whose first term is 6 and whose second term is 4. [3]

P1 June 02

4 A progression has a first term of 12 and a fifth term of 18.

(i) Find the sum of the first 25 terms if the progression is arithmetic. [3]

(ii) Find the 13th term if the progression is geometric. [4]

P1 Nov 02

1 Find the value of the term which is independent of x in the expansion of $\left(x + \frac{3}{x}\right)^4$. [3]

2 A geometric progression, for which the common ratio is positive, has a second term of 18 and a fourth term of 8. Find

(i) the first term and the common ratio of the progression, [3]

(ii) the sum to infinity of the progression. [2]