

1. Nov/2021/Paper_9709/11/No.1

(a) Expand $\left(1 - \frac{1}{2x}\right)^2$. [1]

.....

.....

.....

.....

(b) Find the first four terms in the expansion, in ascending powers of x , of $(1 + 2x)^6$. [2]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

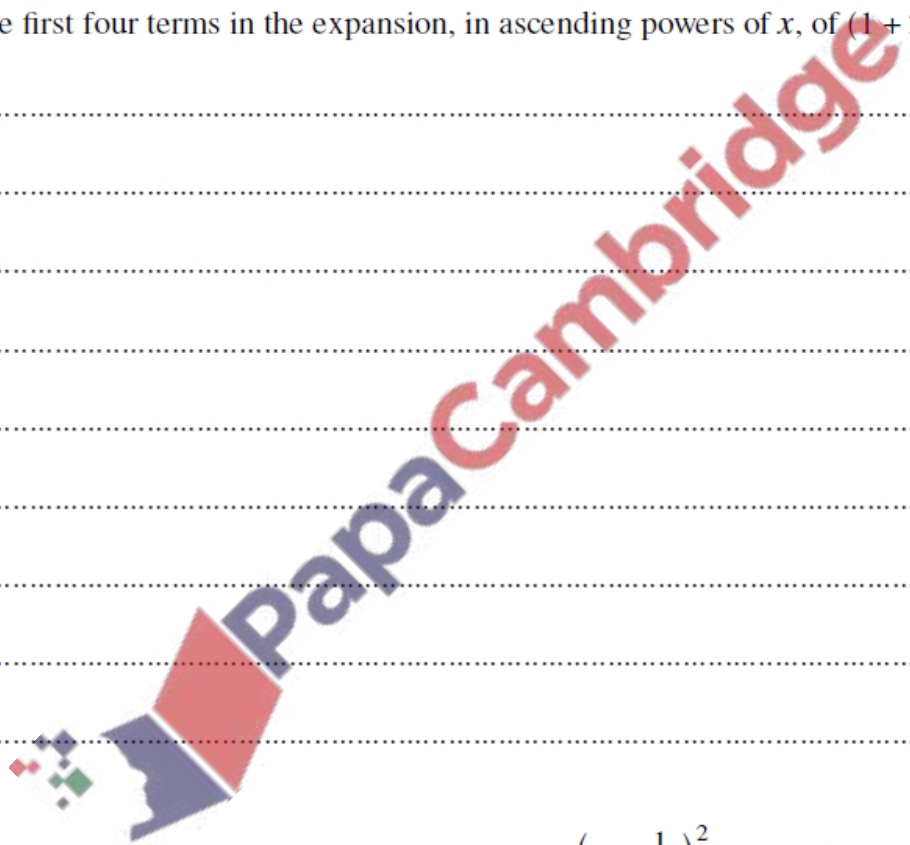
.....

.....

.....

.....

.....



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

.....

.....

.....

.....

.....

.....

.....

2. Nov/2021/Paper_9709/11/No.4

The first term of an arithmetic progression is a and the common difference is -4 . The first term of a geometric progression is $5a$ and the common ratio is $-\frac{1}{4}$. The sum to infinity of the geometric progression is equal to the sum of the first eight terms of the arithmetic progression.

(a) Find the value of a .

[4]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

The k th term of the arithmetic progression is zero.

(b) Find the value of k .

[2]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

3. Nov/2021/Paper_9709/12/No.5

The first, third and fifth terms of an arithmetic progression are $2 \cos x$, $-6\sqrt{3} \sin x$ and $10 \cos x$ respectively, where $\frac{1}{2}\pi < x < \pi$.

(a) Find the exact value of x .

[3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(b) Hence find the exact sum of the first 25 terms of the progression.

[3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

5. Nov/2021/Paper_9709/12/No.8

(a) It is given that in the expansion of $(4 + 2x)(2 - ax)^5$, the coefficient of x^2 is -15 .

Find the possible values of a .

[4]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

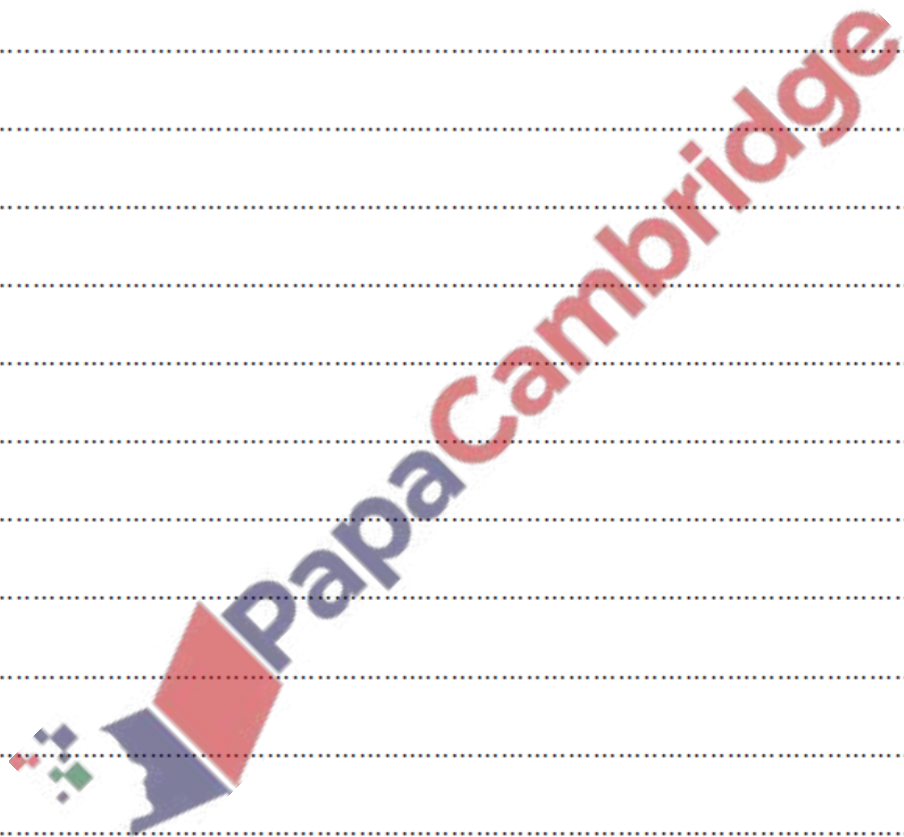
.....

.....

.....

.....

.....



- (a) Find the first three terms, in ascending powers of x , in the expansion of $(1 + ax)^6$. [1]

.....

.....

.....

.....

.....

- (b) Given that the coefficient of x^2 in the expansion of $(1 - 3x)(1 + ax)^6$ is -3 , find the possible values of the constant a . [4]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

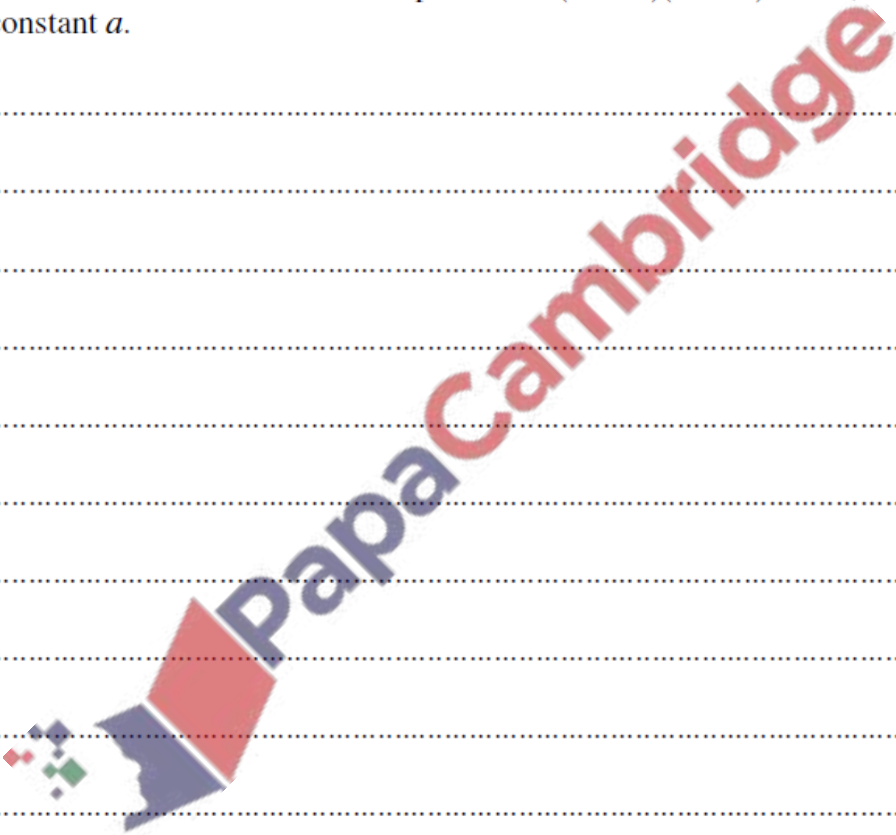
.....

.....

.....

.....

.....



The first term of an arithmetic progression is 84 and the common difference is -3 .

(a) Find the smallest value of n for which the n th term is negative. [2]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

It is given that the sum of the first $2k$ terms of this progression is equal to the sum of the first k terms.

(b) Find the value of k . [3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....