

2 A geometric progression has first term a and common ratio $\cos \theta$, where $0 < \theta < \frac{1}{2}\pi$. It is given that the second term is 8 and the fifth term is $\frac{1}{8}$.

(a) Find the value of θ . Give your answer correct to 3 significant figures. [3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(b) Find the exact value of the sum to infinity. [2]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

3 In the expansion of

$$(px + 3)^5 - \left(x^3 + \frac{p}{x}\right)^4,$$

the coefficient of x^4 is 216.

Find the value of the positive constant p . [5]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

- (a) It is given that $(S_2 - 1)$, S_4 , S_9 are the first three terms of a second arithmetic progression.

[4]

③

- [4]

④

[3]

5

8 The first three terms of a geometric progression are a , b and c respectively, where a , b and c are positive constants. The first three terms of an arithmetic progression are a , b and $-3c$ respectively.

[3]

[5]

⑥

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

3 The third term of a geometric progression is 18 and the sum of the first three terms is 26. It is given that the common ratio is negative.

(a) Find the tenth term of the progression. Give your answer correct to 3 significant figures. [5]

(b) Find the exact value of the sum to infinity of the progression. [2]

- 5 (a) Find the first three terms, in ascending powers of x , in the expansion of each of the following expressions.

(i) $(2-px)^5$ [2]

(ii) $\left(1 - \frac{1}{2}x\right)^4$ [2]

- (b) Given that the coefficient of x^2 in the expansion of $(2 - px)^5 \left(1 - \frac{1}{2}x\right)^4$ is 93, find the possible values of the constant p . [3]

- 3 The coefficient of x' in the expansion of $\left(px^{\frac{1}{2}} + \frac{7}{p}x\right)$ is 1280.

Find the value of the constant p . [4]

- (i) Find the value of k . [2]

[illegible]

- [illegible]

- Find the sum to infinity of the progression. Give your answer in the form $\frac{a}{\sqrt{b}-c}$, where a , b and c are integers. [5]

[illegible]