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8. A geometric series has first term a and common ratio r.

(a) Prove that the sum of the first n terms of this series is given by

$$S_n = \frac{a(1 - r^n)}{1 - r}$$

(3)

The second term of a geometric series is –320 and the fifth term is $\frac{512}{25}$

(b) Find the value of the common ratio.

(2)

(c) Hence find the sum of the first 13 terms of the series, giving your answer to 2 decimal places.

(3)

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Question 8 continued

Q8

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9. (i) Find the exact value of x for which

$$\log_3(x + 5) - 4 = \log_3(2x - 1)$$

(4)

(ii) Given that

$$3^{y+3} \times 2^{1-2y} = 108$$

(a) show that

$$0.75^{y} = 2$$

(4)

(b) Hence find the value of y, giving your answer to 3 decimal places.

(2)

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