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Arithmetic Progression

| Past Paper Question | P1CIE Nov 2013 Q9(a)

- (a) In an arithmetic progression the sum of the first ten terms is 400 and the sum of the next ten terms is 1000. Find the common difference and the first term. [5]

$$S_n = \frac{n}{2} [2a + (n-1)d]$$

Given $S_{10} = 400$

$$\therefore \frac{10}{2} [2a + 9d] = 400$$

$$\therefore 10a + 45d = 400 \quad (1)$$

and $S_{20} = 1400$

$$\therefore \frac{20}{2} [2a + 19d] = 1400$$

$$\therefore 20a + 190d = 1400 \quad (2)$$

$$(1) \times 2 \quad 20a + 90d = 800 \quad (3)$$

$$(2) \times 1 \quad 20a + 190d = 1400 \quad (2)$$

$$(2) - (3) \quad 100d = 600$$

$$\therefore d = 6$$

Sub. $d = 6$ into (1)

$$\therefore 10a + 45(6) = 400$$

$$\therefore 10a + 270 = 400$$

$$\therefore 10a = 130$$

$$\therefore a = 13$$

$$\therefore a = 13, d = 6$$

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