

Discrete Assignment

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Question 11.9.5.15: The p th, q th and r th terms of an AP are a, b, c respectively. Show that

$$(q - r)a + (r - p)b + (p - q)c = 0$$

Solution:

The AP has the following parameters

Term	Value	Description
$x(0)$	-	First term
d	-	Common Difference
$x(n)$	$x(0) + nd$	General term
$x(p)$	a	p th term
$x(q)$	b	q th term
$x(r)$	c	r th term

TABLE 0
INPUT PARAMETERS

Now,

$$x(0) + pd = a \quad (1)$$

$$x(0) + qd = b \quad (2)$$

$$x(0) + rd = c \quad (3)$$

$$p - q = \frac{a - b}{d} \quad (4)$$

$$q - r = \frac{b - c}{d} \quad (5)$$

$$r - p = \frac{c - a}{d} \quad (6)$$

Now, from (4), (5) and (6),

$$(q - r)a + (r - p)b + (p - q)c = \frac{b - c}{d}.a + \frac{c - a}{d}.b + \frac{a - b}{d}.c \quad (7)$$

$$= 0 \quad (8)$$

Hence proved