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CSE - AI

Q) Find the GCD (512, 320) and express it as a linear combination of 512 and 320.

Soln Using Euclid's method we have

$$512 = 1 \times 320 + 192$$

$$320 = 1 \times 192 + 128$$

$$192 = 1 \times 128 + 64$$

$$128 = 2 \times 64 + 0$$

we have our remainder = 0 for 64

$$\text{thus } \gcd(512, 320) = 64$$

Now, using the equations used in Euclidean method

$$64 = 192 - 1(128) \quad \text{--- (i)}$$

$$\text{but } 128 = 320 - 1(192) \quad \text{--- (ii)}$$

$$\& \quad 192 = 512 - 320 \quad \text{--- (iii)}$$

Thus eqⁿ is

$$64 = 192 - 1(128) = 192 - 1(320 - 192) \quad \text{[from eq (ii)]}$$

$$= 2(192) - 320$$

$$= 2(512 - 320) - 320$$

$$= 2(512) - 3(320)$$

$$64 = 2(512) - 3(320) \quad \& \quad \gcd = ma + nb$$

$$\text{here } \gcd = 64, m = 2, n = -3$$