Task: Divisibility by 24

Task: A positive integer is divisible by 24 if and only if it is divisible by m and n. The above statement is true for:

a) $m = 8, n = 6$

b) $m = 4, n = 6$

c) $m = 4, n = 12$

d) $m = 3, n = 8$

Solution:

To determine which pairs (m, n) make the statement true, we need to check if the least common multiple (LCM) of m and n equals 24. A number is divisible by 24 if it is also divisible by both m and n.

a) $m = 8, n = 6$

- $\text{LCM}(8, 6) = 24$
- Therefore, the statement is true.

b) $m = 4, n = 6$

- $\text{LCM}(4, 6) = 12$
- Therefore, the statement is false.

c) $m = 4, n = 12$

- $\text{LCM}(4, 12) = 12$
- Therefore, the statement is false.

d) $m = 3, n = 8$

- $\text{LCM}(3, 8) = 24$
- Therefore, the statement is true.

Conclusion: The statement is true for options a) and d).