Use Fermat's method to determine the decomposition of the number $n = 9699$ into two factors.

Important note: All answer boxes should be filled in using the convention that those not applicable must be filled in with x.

Solution.

Initialization:

$t_0 = [\sqrt{n}]$= 98

Iterations:

$t = t_0 + 1$: $t^2 - n$= 102 perfect square (yes/no) no

$t = t_0 + 2$: $t^2 - n$= 301 perfect square (yes/no) no

$t = t_0 + 3$: $t^2 - n$= 502 perfect square (yes/no) no

$t = t_0 + 4$: $t^2 - n$= 705 perfect square (yes/no) no

$t = t_0 + 5$: $t^2 - n$= 910 perfect square (yes/no) no

$t = t_0 + 6$: $t^2 - n$= 1117 perfect square (yes/no) no

$t = t_0 + 7$: $t^2 - n$= 1326 perfect square (yes/no) no

$t = t_0 + 8$: $t^2 - n$= 1537 perfect square (yes/no) no

$t = t_0 + 9$: $t^2 - n$= 1750 perfect square (yes/no) no

$t = t_0 + 10$: $t^2 - n$= 1965 perfect square (yes/no) no

$t = t_0 + 11$: $t^2 - n$= 2182 perfect square (yes/no) no

$t = t_0 + 12$: $t^2 - n$= 2401 perfect square (yes/no) yes

$t = t_0 + 13$: $t^2 - n$= x perfect square (yes/no) x

$t = t_0 + 14$: $t^2 - n$= x perfect square (yes/no) x

$t = t_0 + 15$: $t^2 - n$= x perfect square (yes/no) x

$t = t_0 + 16$: $t^2 - n$= x perfect square (yes/no) x

$t = t_0 + 17$: $t^2 - n$= x perfect square (yes/no) x

$t = t_0 + 18$: $t^2 - n$= x perfect square (yes/no) x

$t = t_0 + 19$: $t^2 - n$= x perfect square (yes/no) x

$t = t_0 + 20$: $t^2 - n$= x perfect square (yes/no) x

Values:

s= 49 t= 110

Conclusion:

The obtained two factors of n are (in increasing order!) 61 and 159.