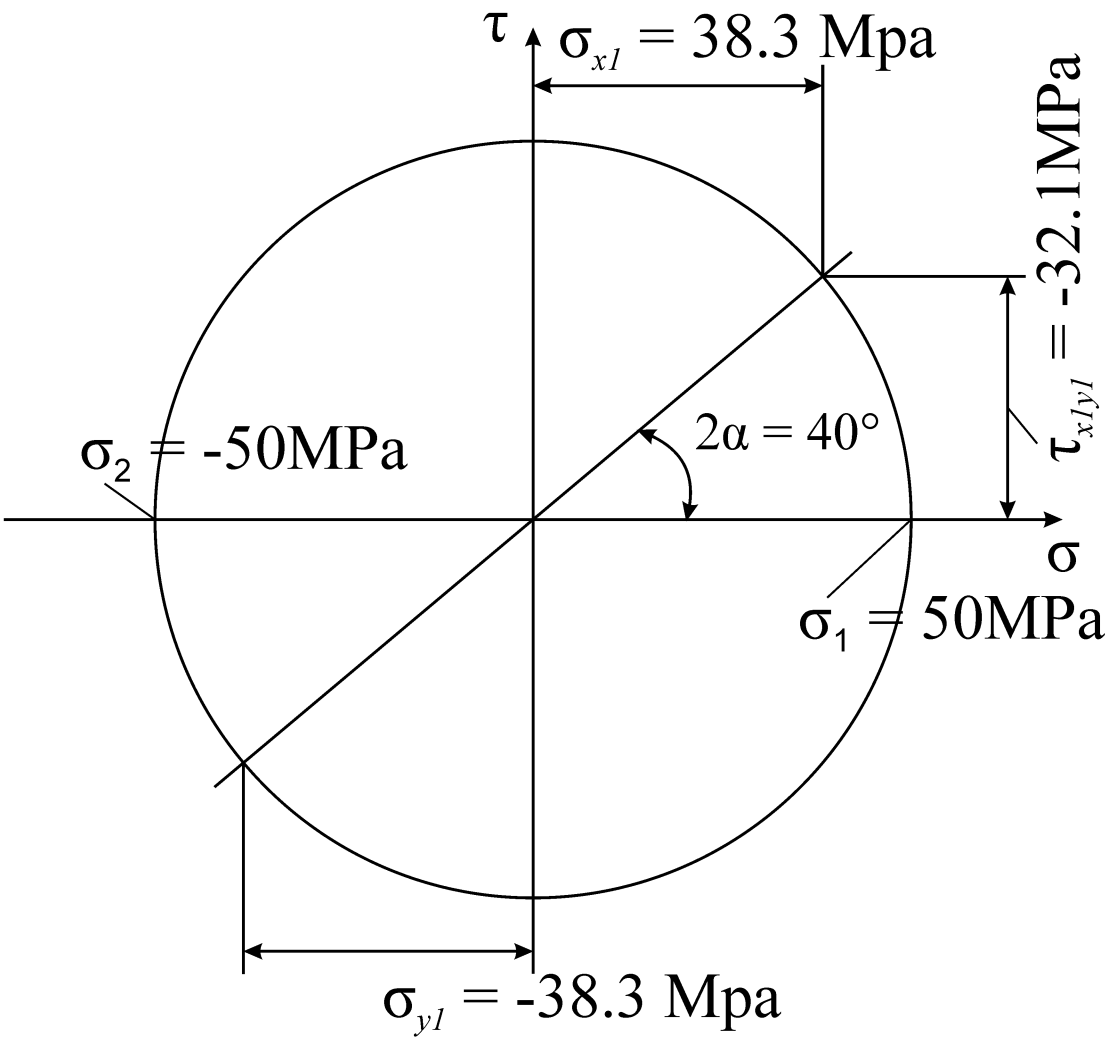
The solution for the task #79804

We have the $\sigma_x = 50MPa$, $\sigma_y = -50MPa$. There are no shear stresses at plane element. So the principal stresses are $\sigma_1 = 50MPa$, $\sigma_2 = -50MPa$ ($\sigma_1 > \sigma_2$). We review plane stress strain state so $\sigma_3 = 0$ we don't take into account. Having this info we compose Mohr's circle as it is presented on the pic. 1.



Picture 1 – The Mohr's circle

The procedure of definition of stresses is shown on the pic. 1 for inclined plane on 20 degrees relatively principle planes (coordinate axis).

Answer: $\sigma_{x1} = 38.3$ MPa, $\sigma_{y1} = -38.3$ MPa, $\tau x1y1 = -32.1$ MPa.

P.S.: To confirm the solution additional checkouts can be presented, such as analytical solution and confirmation for invariants. But here is only graphic way is presented as it was demanded by the task. There are different rules for the shear stresses signs. One of these rules was used.

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