Question #6736 If $a < 1/2$ and $b < 1/2$ then $a + b < 1$ Write the converse of this statement. Is the converse true? Write the contrapositive of this statement. Is the contrapositive true?Explain

Solution. If one has the statement: if P then Q, then the converse is if Q then P. Hence in our case it is: if $a + b < 1$ then $a < 1/2$ and $b < 1/2$. It is false. For instance $a = -2$ $b = 1$, $a + b = -1 < 1$, but $b > 1/2$.

The contrapositive: if not Q then not P, so if $a + b \geq 1$ then $a \geq 0.5$ or $b \geq 0.5$. It is true, due to theorem from Logics : If a statement is true, then its contrapositive is true (and vice versa).