1

a CONVERT TO BASE 10: $(1011011.001)_2$

$(1011011.001)_2 = 1.011011001 \times 2^6 = (1 + 0 + \frac{1}{2^2} + \frac{1}{2^3} + 0 + \cdots$

$\cdots + \frac{1}{2^5} + \frac{1}{2^6} + \underset{7}{0} + \underset{8}{0} \cdots$

$\cdots + \underset{9}{\frac{1}{2^9}}) 2^6 = \cdots$

$\cdots = (1 + \frac{1}{4} + \frac{1}{8} + \frac{1}{32} + \frac{1}{64} + \frac{1}{512}) 2^6$

$= (\frac{512}{512} + \frac{128}{512} + \frac{64}{512} + \frac{16}{512} + \frac{8}{512} + \frac{1}{512}) 64$

$= \left(\frac{729}{512} \cdot 64\right)_{10} = \boxed{9.1125 \times 10}$