If k = 1 and you sign two messages, the probability of having at least one pair of messages with identical signatures is given by the birthday paradox.

$p = 1 - (n! / (n^k * (n - k)!))$

We learned in class that when doing the birthday paradox we can approximate it by taking the square root of the signed messages like such:

$p \approx \sqrt{pi * n / 2}$

Where $n = 2^d$

If you solve this then we see that we need a $d = 16$

P.S. I found a collision of two grammatically correct sentences by hard coding the sentence I wanted and then just going through numbers until a collision occurred.