Estimating The Difference of Two Population Proportions

In a recent survey on academic dishonesty simple random samples of 200 female and 100 male college students were taken. 24 of females and 26 of the males agreed or strongly agreed with the statement "Under some circumstances academic dishonesty is justified." Previous studies have suggested that population proportion of males who agree or strongly agree with the statement is 0.1 greater than the population proportion of females who agree or strongly agree with the statement.the Researchers believe the difference is greater than that. Thus, they seek to test

$$
\begin{aligned}
H_0: & \quad p_f - p_m & = & \quad -0.10 \\
H_a: & \quad p_f - p_m & < & \quad -0.10
\end{aligned}
$$

at the 0.05 level of significance.

The standardized test statistic is

$$
\begin{aligned}
z^* &= \frac{24/200 - 26/100 - (-0.10)}{\sqrt{\frac{0.12(1-0.12)}{200} + \frac{0.26(1-0.26)}{100}}} \\
&= -0.81,
\end{aligned}
$$

which gives the p-value $p_- = P(N(0,1) \leq -0.81) = 0.2090$. Since $0.2090 > 0.05$, H_0 is not rejected.