(3) **Simulation of test-power**

Simulate the test-power in the two-sample t-test: Let $X_1, \ldots, X_n, Y_1, \ldots, Y_n$ be independent random variables with $X_i \sim N(0, \sigma^2)$ and $Y_i \sim N(d, \sigma^2)$ for all $i = 1, 2, \ldots, n$. Let the null hypothesis be $H_0 : d = 0$ and the significance level $\alpha = 5\%$. Simulate the test-power (by computing the relative frequency of rejections) for $d \in \{-5, -4.5, -4, \ldots, 5\}$ in 1000 simulations each. Use the parameters

(a) $n = 10$ and $\sigma = 3$

(b) $n = 20$ and $\sigma = 3$

(c) $n = 20$ and $\sigma = 1$

for each of which you plot the testpower against d. Comment on your graphic. Hint: You can access the p-value with `t.test()$p.value`.