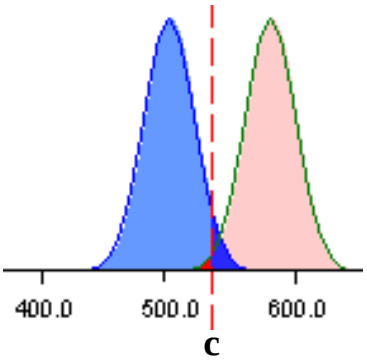
Power calculation where power = .991

To compute power we can use the formula $Z_\beta = Z_\alpha - \sqrt{N}\, d$

[Click here for an explanation of how this power formula is derived.]



The current example has the following values:

Alpha error = .05 one-tailed, so $Z_\alpha = 1.645$
The sample size is 25, so N = 25
The effect size d = (580 – 500) / 100 = 80 / 100 = .800

Using the formula $Z_\beta = Z_\alpha - \sqrt{N}\, d$

$Z_\beta = 1.645 - 5.00\ (0.800) = 1.645 - 4.000 = -2.355$.

We will reject the null hypothesis if we observe a score greater than the critical value **c** on the blue null sampling distribution, defined by $Z_\alpha = 1.645$. $Z_\beta = -2.355$ corresponds to the Z score for the critical value **c** on the red/pink (alternate hypothesis) sampling distribution. We can use the WISE p-z converter or a Z table to find that the probability of observing a Z score greater than -2.355 is .991. This is the probability of rejecting the null hypothesis if the alternate hypothesis is true, i.e., the power of the test in this scenario.