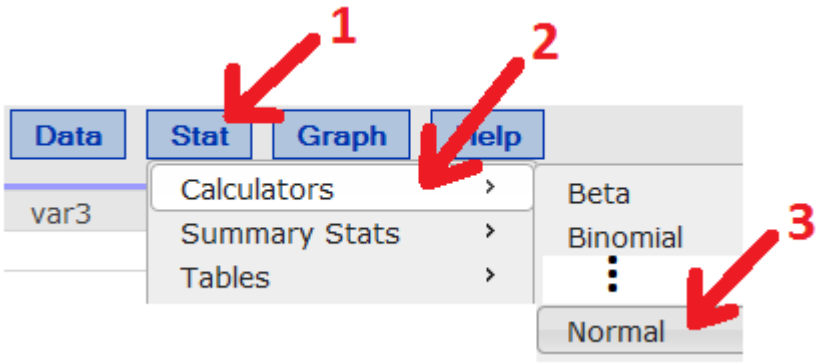
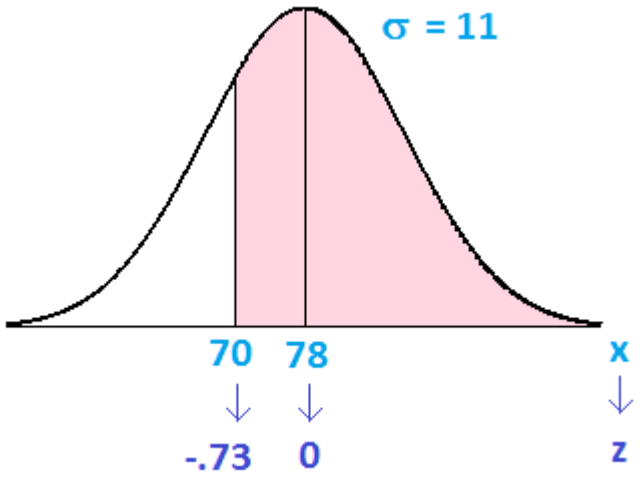
Using StatCrunch to compute normal probabilities

The StatCrunch Normal calculator is very useful for calculating normal probabilities. To find it, look under the "Stat" menu (1), select "Calculators" (2), and choose the "Normal" calculator (3).



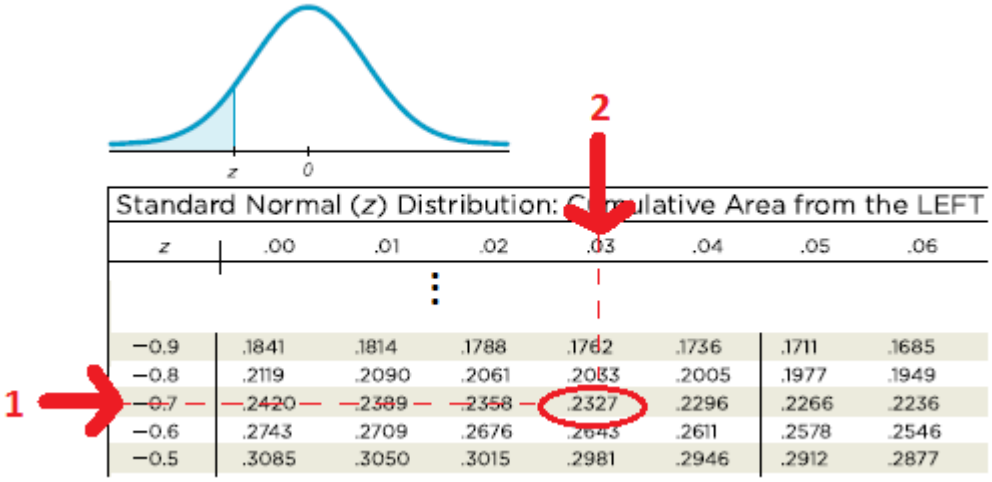
PROBLEM: *The scores on a test are normally distributed with a mean of 78 and a standard deviation of 11. What is the probability that a randomly selected score is greater than 70?*

SOLUTION: *(By Hand) The probability we are asked to find is equivalent to the shaded area in the given figure.*



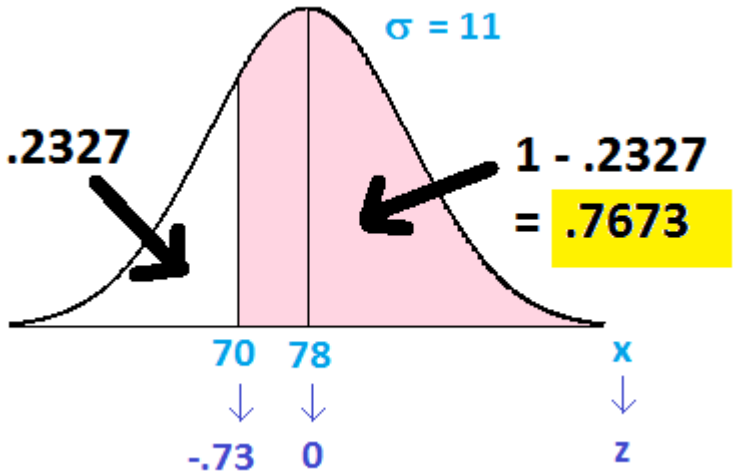
We would need to standardize the curve and convert the x-values to z-scores. Since 78 is the mean, it has a z-score of 0. The z-score for 70 can be approximated by $z = \frac{70-78}{11} \approx -.73$. *So,* $P(x > 70) \approx P(z > -.73)$.

We can use a standard normal table to find the area to the left of $z = -.73$. *Notice that the* -0.7 *row (1) and the* $.03$ *column (2) intersect at an area of* $.2327$ *.*



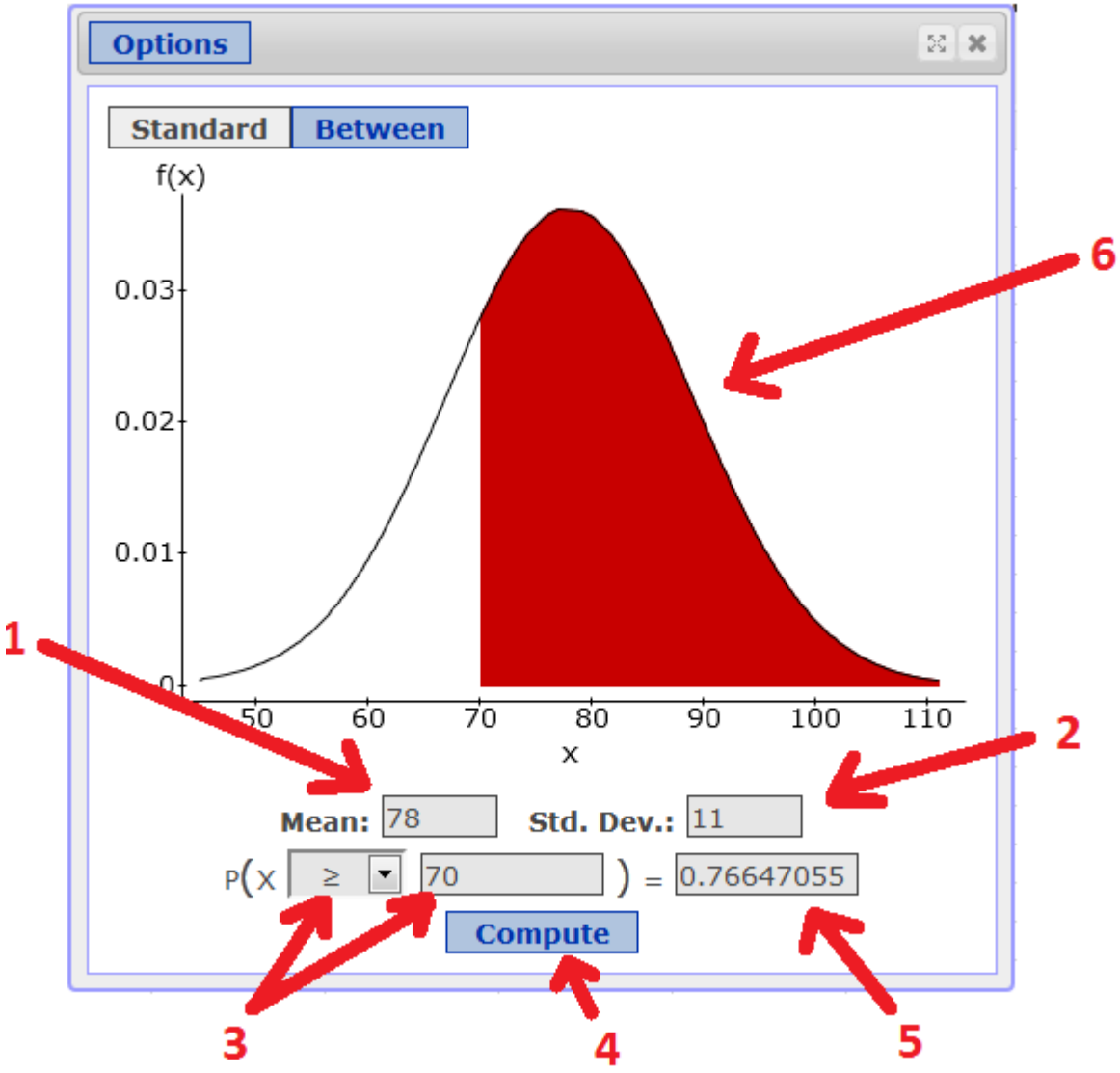
z	.00	.01	.02	.03	.04	.05	.06
−0.9	.1841	.1814	.1788	.1762	.1736	.1711	.1685
−0.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949
−0.7	.2420	.2389	.2358	.2327	.2296	.2266	.2236
−0.6	.2743	.2709	.2676	.2643	.2611	.2578	.2546
−0.5	.3085	.3050	.3015	.2981	.2946	.2912	.2877

So, the area to the left of $z = -.73$ *is* $.2327$*, which means the area to the right is* $.7673$*, which is our answer.*



SOLUTION: *(Using StatCrunch) Open the Normal calculator. We must supply the mean which we know to be 78 (1) and the standard deviation which is 11 (2). We are looking for* $P(x > 70)$ *so we fill in the given probability accordingly (3). Click "Compute" (4) and the answer appears (5).*

Notice the graph shows everything to the right of 70 shaded (6), indicating the area we have found.



NOTE: *Our answer by hand was .7673 and our StatCrunch answer (to 4 decimal places) is .7665.*

The StatCrunch answer is MORE accurate than the one found from the table, because StatCrunch did not round the z-value to 2 decimal places!