Test Plan

*Reduce Method:* The first step in testing was to test that the reduce function was returning correct results. I tested this by having the fractions I created show in a message box, this feature was removed from the final program once testing was complete.First, the main things to test were that negative numbers returned correctly, i.e. one negative resulted in a negative numerator while two negatives resulted in a positive result. Next, several fractions were entered and checked against hand calculations to ensure that results were correct.

|  |  |  |
| --- | --- | --- |
| **Input** | **Expected** | **Output** |
| -2/1 | -2/1 | -2/1 |
| -2/-1 | 2/1 | 2/1 |
| 32/64 | 1/2 | 1/2 |
| 81/321 | 27/321 | 27/321 |
| -38/56 | -19/28 | -19/28 |

*Mathematical Operations:* After testing that fraction reduction worked correctly the next thing to test is that the mathematical operations are being performed correctly and that both the fractional result and the default result as a decimal with 3 digits to the right of the decimal point worked correctly. The testing for the different mathematical operations were all quite similar, both to each other and to the testing done for the reduce method. Namely the important things to test were that negative numbers returned correctly. However, since how negative and positive results are achieved differ between addition/subtraction and multiplication/division two separate sections are listed below, one for each category. Next, several fractions were entered and checked against hand calculations to ensure that results were correct.

*Addition/Subtraction*

|  |  |  |
| --- | --- | --- |
| **Input** | **Expected** | **Output** |
| -2/-4 + -2/4 | 0/1 0.000 | 0/1 0.000 |
| 10/30 + 40/10 | 13/3 4.33 | 13/3 4.33 |
| -3/5 + -4/7 | -41/35 -1.171 | -41/35 -1.171 |
| -3/-3 + -2/-9 | 11/9 1.222 | 11/9 1.222 |
| 5/11 – 3/9 | 4/33 0.121 | 4/33 0.121 |
| -3/9 - -4/9 | 1/9 0.111 | 1/9 0.111 |
| 5/8 - 8/9 | -19/72 -0.264 | -19/72 -0.264 |

*Multiplication/Division*

|  |  |  |
| --- | --- | --- |
| **Input** | **Expected** | **Output** |
| -2/-3 \* 1/3 | 2/9 0.222 | 2/9 0.222 |
| -2/-3 \* 1/-3 | -2/9 -0.222 | -2/9 -0.222 |
| -2/3 \* -1/-3 | 2/9 0.222 | 2/9 0.222 |
| -2/3 / 1/3 | 2/1 2.000 | 2/1 2.000 |
| -2/3 / -1/3 | 2/1 2.000 | 2/1 2.000 |
| -2/-3 / 1/-3 | -2/1 -2.000 | -2/1 -2.000 |
| 2/3 \* 1/3 | 2/1 2.000 | 2/1 2.000 |

*Mixed number and double outputs:* Testing for this is straightforward, take one of the previous tables and click on the two different output types and see if they correctly change. Compare results vs hand results.

|  |  |  |
| --- | --- | --- |
| **Input** | **Expected** | **Output** |
| -2/-4 + -2/4 | 0 and 0/1 0 | 0 and 0/1 0 |
| 10/30 + 40/10 | 4 and 1/3 4.333333333333333 | 4 and 1/3 4.333333333333333 |
| -3/5 + -4/7 | -1 and -6/35 -1.1714285714285715 | -1 and -6/35 -1.1714285714285715 |
| -3/-3 + -2/-9 | 1 and 2/9 1.2222222222222223 | 1 and 2/9 1.2222222222222223 |
| 5/11 – 3/9 | 4/33 0.12121212121212122 | 4/33 0.12121212121212122 |
| -3/9 - -4/9 | 1/9 0.1111111111111111 | 1/9 0.1111111111111111 |
| 5/8 - 8/9 | -19/72 0.2638888888888889 | -19/72 0.2638888888888889 |

*Clear button and input validation:* Check the clear button is working by entering new calculations and ensuring that they are also correct. This checks that there is not hidden information lingering in the background from previous calculations. Check that all the textboxes and output labels clear. Try entering invalid input such as 0, decimal numbers, and non-numeric characters.