Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Unit 4 Review – Rationals**

**Helpful Information:**

**Multiplying** – Factor and cancel common factors between the numerator and denominator

**Dividing** – Keep Change Flip (aka multiply by the reciprocal)

**Adding/Subtracting** – Find common denominators

**Synthetic Division (uses the root)** is a shortcut for **Long Division (uses the whole polynomial)** that can *only* be used when the leading coefficient of the binomial you divide by is 1

If something is a **factor** of a polynomial you can check by (remember if it is short answer you need to be able to show work):

* Synthetic division will have no remainder
* Long Division will have no remainder
* Evaluating the function at the root will give you 0
* Look for a root on the graph (where it crosses the x-axis)
* Look in the table for the x-value when y=0

**Rational Root Theorem** - potential roots of a polynomial are found by finding all the positive and negative values of the factors of the last term divided by the factors of the first term

**Level I Practice:**

1. The zeros for  are

|  |  |
| --- | --- |
| 1) |  |
| 2) |  |
| 3) |  |
| 4) |  |

1. Solve for *x*: 
2. When  is divided by , the remainder is 0. Given , which conclusion about  is true?

|  |  |
| --- | --- |
| 1) |  |
| 2) |  |
| 3) |  is a factor of . |
| 4) | No conclusion can be made regarding . |

**Level II Practice:**

1. The expression  is equivalent to

|  |  |
| --- | --- |
| 1) |  |
| 2) |  |
| 3) |  |
| 4) |  |

1. Determine if  is a factor of . Explain your answer.
2. Algebraically prove that , where .

**Level III Practice:**

1. What is the solution, if any, of the equation ?

|  |  |
| --- | --- |
| 1) | -1 |
| 2) | -5 |
| 3) | all real numbers |
| 4) | no real solution |

1. Given  and , state the quotient and remainder of , in the form .