

Use long division to rewrite the following rational expressions as polynomials plus simpler rational expressions:

1. Here is a basic one:

$$\frac{x^2 - 3x - 10}{x + 2}$$

2. This one is slightly longer:

$$\frac{x^4 + x + 1}{x + 1}$$

3. This one has a lot of missing terms, and so things will be slightly more challenging to keep organized:

$$\frac{x^5 - 1}{x + 1}$$

4. This problem is much like the last, but slightly more complicated since the denominator has three terms instead of 2:

$$\frac{x^5 - 1}{x^2 + x + 1}$$

5. The coefficients will be slightly larger in this problem:

$$\frac{3x^3 - 2x^2 + 4x - 3}{x^2 + 3x + 3}$$