

Section 3.3 Dividing Polynomials; Remainder and Factor Theorems

78

HOW TO DIVIDE A POLYNOMIAL USING LONG DIVISION

1. Write the problem in long division form.
 - ✓ Arrange the terms of each polynomial in descending powers.
 - ✓ If a term is missing, add a term of the form $0x^r$, where r is the degree of the missing term.
2. Divide the first term of the dividend by the first term of the divisor.
3. Multiply the divisor by the term you found in Step 2.
4. Subtract the expression you found in Step 3 from the dividend.
5. Bring down the next term from the dividend.
6. Repeat Steps 2 through Step 5 until the degree of the remainder is less than the degree of the divisor.
7. Write your answer as: $quotient + \frac{remainder}{divisor}$.

Example 1: Divide using long division. State the quotient, $q(x)$, and the remainder, $r(x)$.