

Algebra 2

4-03 Divide Polynomials (4.3)

Polynomial Long Division

1. Set up the division problem. _____) _____
2. _____ the _____ term of the dividend by the _____ term of the divisor.
3. _____ the answer by the divisor and write it below the like terms of the dividend.
4. _____ the bottom from the top.
5. _____ the next term of the dividend.
6. _____ steps 2-5 until reaching the last term of the dividend.
7. If the remainder is not zero, write it as a _____ using the divisor as the denominator.

$$\frac{y^4 + 2y^2 - y + 5}{y^2 - y + 1}$$

$$\frac{x^3 + 4x^2 - 3x + 10}{x + 2}$$

Synthetic Division

- _____ form of long division for dividing by a _____
- Only when dividing by _____

How to do Synthetic Division

To divide a polynomial by $x - k$,

1. Write _____ for the divisor.
2. Write the _____ of the dividend.
3. Bring the _____ coefficient down.
4. _____ the lead coefficient by k . Write the product in the next column.
5. _____ the terms of the second column.
6. _____ the result by k . Write the product in the next column.
7. _____ steps 5 and 6 for the remaining columns.
8. Use the bottom numbers to write the _____. The number in the last column is the remainder, the next number from the right has degree 0, the next number from the right has degree 1, and so on. The quotient is always _____ degree less than the dividend.

Synthetic Division

$$(-5x^5 - 21x^4 - 3x^3 + 4x^2 + 2x + 2)/(x + 4)$$

$$(y^5 + 32) \div (y + 2)$$

173 #1, 3, 5, 7, 9, 11, 13, 15, 21, 31, Mixed Review = 15