

Dividing polynomials $(2x^3 - 3x^2 + 4x + 5) \div (x + 2)$ which could also be written as $\frac{2x^3 - 3x^2 + 4x + 5}{x + 2}$

We can identify the dividend, the divisor, the quotient, and the remainder.

$$2x^3 - 3x^2 + 4x + 5 = (x + 2)(2x^2 - 7x + 18) + (-31)$$

↑
↑
↑
↑

Dividend
Divisor
Quotient
Remainder

If one polynomial has a remainder of zero when divided by another polynomial then it is a factor of the polynomial.

$$(x^2 - 8x - 16) \div (x + 4)$$

$$(x^2 - 81) \div (x - 9)$$

$$(6x^3 - 11x^2 + 11x - 2) \div (2x - 3)$$

$$(3x^4 + 2x^3 - 11x^2 - 2x + 5) \div (x^2 - 2)$$

Synthetic division may be used when dividing by a polynomial of degree one (linear)

$$(x^2 - 8x - 16) \div (x + 4)$$

$$(x^2 - 81) \div (x - 9)$$

$$(6x^3 - 11x^2 + 11x - 2) \div (2x - 3)$$

One factor is $x^2 + 5x + 7$

