Bell Work

Expand the binomial.

$$(2y - 1)^5$$

Long Division of Polynomials

When you divide a polynomial $f(x)$ by a nonzero polynomial divisor $d(x)$, you get a quotient polynomial $q(x)$ and a remainder polynomial $r(x)$.

$$\frac{f(x)}{d(x)} = q(x) + \frac{r(x)}{d(x)}$$

Divide $2x^4 + 3x^3 + 5x - 1$ by $x^2 + 3x + 2$.

$$(4x^2 + 3x - 11) \div (x + 1)$$

Synthetic Division

Divide $-x^3 + 4x^2 + 9$ by $x - 3$.

Divide $3x^3 - 2x^2 + 2x - 5$ by $x + 1$.

$$(x^3 - 3x^2 - 7x + 6) \div (x - 2)$$

$$(2x^3 - x - 7) \div (x + 3)$$

KEY IDEA

The Remainder Theorem

If a polynomial $f(x)$ is divided by $x - k$, then the remainder is $r = f(k)$.

Use synthetic division to evaluate

$f(x) = 5x^3 - x^2 + 13x + 29$ when $x = -4$.