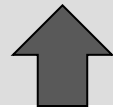


Polynomdivision

<https://www.gut-erklaert.de/mathematik/polynomdivision.html>

$$(x^3 - 6x^2 - x + 6) : (x - 1) =$$



*Das ist ein
Polynom 3.
Grades*



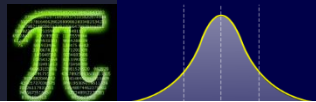
*Das ist ein
Polynom 1.
Grades*

Video auf Youtube:

<https://www.youtube.com/watch?v=WaRxx94rlgk>

POLYNOMDIVISION





Polynomdivision

$$(x^3 - 6x^2 - x + 6) : (x - 1) =$$

$$(\boxed{x^3} - 6x^2 - x + 6) : (\boxed{x} - 1) = \boxed{x^2}$$

$$(x^3 - 6x^2 - x + 6) : \boxed{(x - 1)} = \boxed{x^2}$$

$$\boxed{x^3 - x^2}$$

$$\boxed{\begin{array}{r} (x^3 - 6x^2 - x + 6) : (x - 1) = x^2 \\ -(x^3 - x^2) \\ \hline -5x^2 \end{array}}$$

$$\boxed{\begin{array}{r} (x^3 - 6x^2 - x + 6) : (x - 1) = x^2 \\ -(x^3 - x^2) \\ \hline -5x^2 - x \end{array}}$$

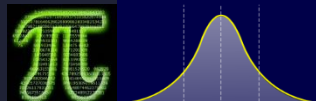
Wir rechnen hier zunächst $x^3 : x$.

Als nächstes rechnen wir $x^2 \cdot (x - 1) = x^3 - x^2$.

Dies schreiben wir unter $x^3 - 6x^2$.

Dies ziehen wir ab und erhalten $-5x^2$.

Das $-x$ ziehen wir nun runter:



Polynomdivision

$$\begin{array}{r} (x^3 - 6x^2 - x + 6) : (x - 1) = x^2 \\ -(x^3 - x^2) \\ \hline -5x^2 - x \end{array}$$

Jetzt geht alles wieder von vorne los.

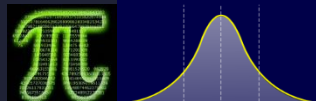
Also Division: $-5x^2 : x = -5x$

$$\begin{array}{r} (x^3 - 6x^2 - x + 6) : (x - 1) = x^2 - 5x \\ -(x^3 - x^2) \\ \hline -5x^2 - x \end{array}$$

$$(-5x) \cdot (x-1) = -5x^2 + 5x$$

$$\begin{array}{r} (x^3 - 6x^2 - x + 6) : (x - 1) = x^2 - 5x \\ -(x^3 - x^2) \\ \hline -5x^2 - x \\ -5x^2 + 5x \\ \hline \end{array}$$

Es erfolgt wieder eine Subtraktion:



Polynomdivision

$$(x^3 - 6x^2 - x + 6) : (x - 1) = x^2 - 5x$$

$$-(x^3 - x^2)$$

$$-5x^2 - x$$

$$-(-5x^2 + 5x)$$

$$-6x$$

Wir ziehen + 6 runter

$$(x^3 - 6x^2 - x + 6) : (x - 1) = x^2 - 5x$$

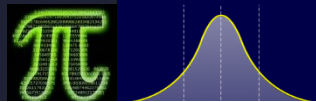
$$-(x^3 - x^2)$$

$$-5x^2 - x$$

$$-(-5x^2 + 5x)$$

$$-6x + 6$$

wieder eine Division: $(-6x) : x = -6$

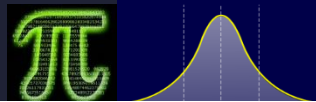


Polynomdivision

$$\begin{array}{r}
 (x^3 - 6x^2 - x + 6) : (x - 1) = x^2 - 5x - 6 \\
 \underline{-(x^3 - x^2)} \\
 -5x^2 - x \\
 \underline{-(-5x^2 + 5x)} \\
 -6x + 6
 \end{array}$$

eine letzte Multiplikation: $(-6) \cdot (x-1) = -6x + 6$

$$\begin{array}{r}
 (x^3 - 6x^2 - x + 6) : (x - 1) = x^2 - 5x - 6 \\
 \underline{-(x^3 - x^2)} \\
 -5x^2 - x \\
 \underline{-(-5x^2 + 5x)} \\
 -6x + 6 \\
 \underline{-6x + 6} \\
 0
 \end{array}$$

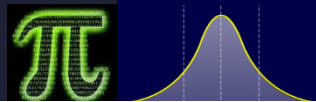


Polynomdivision

$$\begin{array}{r} (x^3 - 6x^2 - x + 6) : (x - 1) = x^2 - 5x - 6 \\ -(x^3 - x^2) \\ \hline -5x^2 - x \\ -(-5x^2 + 5x) \\ \hline -6x + 6 \\ -\left(\frac{-6x + 6}{0}\right) \end{array} \quad \text{fertig!}$$

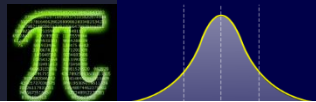
Probe:

$$\begin{aligned} (x^2 - 5x - 6) \cdot (x - 1) &= \\ x^3 - x^2 - 5x^2 + 5x - 6x + 6 &= \\ x^3 - 6x^2 - x + 6 & \end{aligned}$$



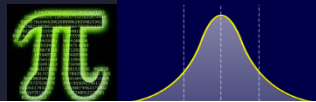
Polynomdivision Übung 1

$$\begin{array}{r} (x^3 - 2x^2 - 5x + 6) : (x - 1) = x^2 - x - 6 \\ \underline{-(x^3 - x^2)} \\ -x^2 - 5x \\ \underline{-(-x^2 + x)} \\ -6x + 6 \\ \underline{-(-6x + 6)} \\ 0 \end{array}$$



Polynomdivision Übung 2

$$\begin{array}{r} (3x^3 - 10x^2 + 7x - 12) : (x - 3) = 3x^2 - x + 4 \\ -(3x^3 - 9x^2) \\ \hline -x^2 + 7x \\ -(-x^2 + 3x) \\ \hline 4x - 12 \\ -(4x - 12) \\ \hline 0 \end{array}$$



Polynomdivision Übung 3

$$(x^5 - 1) : (x - 1) = x^4 + x^3 + x^2 + x$$

$$\begin{array}{r} -(x^5 - x^4) \\ \hline \end{array}$$

$$x^4 - 1$$

$$\begin{array}{r} -(x^4 - x^3) \\ \hline \end{array}$$

$$x^3 - 1$$

$$\begin{array}{r} -(x^3 - x^2) \\ \hline \end{array}$$

$$x^2 - 1$$

$$\begin{array}{r} -(x^2 - x) \\ \hline \end{array}$$

$$x - 1$$

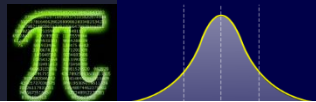
$$\begin{array}{r} -(x - 1) \\ \hline \end{array}$$

$$0$$

Aufpassen:

$$x^5 - 1 = x^5 + 0 \cdot x^4 + 0 \cdot x^3 + 0 \cdot x^2 + 0 \cdot x^1 - 1$$

$$\text{also: } 0 \cdot x^4 - (-x^4) = x^4 !$$



Polynomdivision mit Rest

$$(x^5 + 3x^4 - 7x^3 + 4x^2 + 3x + 1) : (x^2 + 2x - 3) = x^3 + x^2 - 6x + 19$$

$$\begin{array}{r} -(x^5 + 2x^4 - 3x^3) \\ \hline x^4 - 4x^3 + 4x^2 + 3x + 1 \\ -(x^4 + 2x^3 - 3x^2) \\ \hline -6x^3 + 7x^2 + 3x + 1 \\ -(-6x^3 - 12x^2 + 18x) \\ \hline 19x^2 - 15x + 1 \\ -(19x^2 + 38x - 57) \\ \hline -53x + 58 \end{array}$$

$$(x^5 + 3x^4 - 7x^3 + 4x^2 + 3x + 1) : (x^2 + 2x - 3) = x^3 + x^2 - 6x + 19 + \frac{-53x + 58}{x^2 + 2x - 3}$$