Bsp. 4.5: Divisionsalgorithmus in $\mathbb{Q}[X]$

$$r = \overset{f}{3X^3 + 2X^2 + 3X} \qquad \overset{g}{X + 1} \qquad \overset{q}{}$$

Bsp. 4.5: Divisionsalgorithmus in $\mathbb{Q}[X]$

$$\begin{array}{llll} & f & g & q \\ r = & 3X^3 + 2X^2 + 3X & X + 1 & \end{array}$$

$$r = \underbrace{3X^3 + 2X^2 + 3X}_{f} \quad \underbrace{X + 1}_{g} \quad q$$

Bsp. 4.5: Divisionsalgorithmus in $\mathbb{Q}[X]$

$$\begin{array}{lccc} & & f & g & q \\ r = & 3X^3 + 2X^2 + 3X & X + 1 & 3X^2 & \end{array}$$

Bsp. 4.5: Divisionsalgorithmus in $\mathbb{Q}[X]$

$$
\begin{array}{rrrr}
 & f & g & q \\
r = & 3X^3 + 2X^2 + 3X & X + 1 & 3X^2 \\
 & -3X^2(X+1) & &
\end{array}
$$

Bsp. 4.5: Divisionsalgorithmus in $\mathbb{Q}[X]$

$$
\begin{array}{rrrr}
 & f & g & q \\
r = & 3X^3 + 2X^2 + 3X & X + 1 & 3X^2 \\
 & -3X^2(X+1) & &
\end{array}
$$

Bsp. 4.5: Divisionsalgorithmus in $\mathbb{Q}[X]$

$$
\begin{array}{rrrr}
 & f & g & q \\
 & 3X^3 + 2X^2 + 3X & X + 1 & 3X^2 \\
 & \underline{-3X^2(X+1)} & & \\
r = & -X^2 + 3X & &
\end{array}
$$

Bsp. 4.5: Divisionsalgorithmus in $\mathbb{Q}[X]$

$$
\begin{array}{rrrr}
 & f & g & q \\
 & 3X^3 + 2X^2 + 3X & X + 1 & 3X^2 \\
 & \underline{-3X^2(X+1)} & & \\
r = & -X^2 + 3X & &
\end{array}
$$

Bsp. 4.5: Divisionsalgorithmus in $\mathbb{Q}[X]$

$$
\begin{array}{rrrr}
 & f & g & q \\
 & 3X^3 + 2X^2 + 3X & X + 1 & 3X^2 \\
 & \underline{-3X^2(X+1)} & & \\
r = & -X^2 + 3X & &
\end{array}
$$

Bsp. 4.5: Divisionsalgorithmus in $\mathbb{Q}[X]$

$$
\begin{array}{rrrr}
 & f & g & q \\
 & 3X^3+2X^2+3X & X+1 & 3X^2-X \\
 & \underline{-3X^2(X+1)} & & \\
r = & -X^2+3X & &
\end{array}
$$

Bsp. 4.5: Divisionsalgorithmus in $\mathbb{Q}[X]$

$$
\begin{array}{rrll}
 & f & g & q \\
 & 3X^3+2X^2+3X & X+1 & 3X^2-X \\
 & \underline{-3X^2(X+1)} & & \\
r = & -X^2+3X & & \\
 & -(-X)(X+1) & &
\end{array}
$$

Bsp. 4.5: Divisionsalgorithmus in $\mathbb{Q}[X]$

$$
\begin{array}{rrrr}
 & f & g & q \\
 & 3X^3+2X^2+3X & X+1 & 3X^2-X \\
 & \underline{-3X^2(X+1)} & & \\
r= & -X^2+3X & & \\
 & -(-X)(X+1) & &
\end{array}
$$

Bsp. 4.5: Divisionsalgorithmus in $\mathbb{Q}[X]$

$$
\begin{array}{rrrr}
 & f & g & q \\
 & 3X^3+2X^2+3X & X+1 & 3X^2-X \\
 & \underline{-3X^2(X+1)} & & \\
 & -X^2+3X & & \\
 & \underline{-(-X)(X+1)} & & \\
r= & 4X & &
\end{array}
$$

Bsp. 4.5: Divisionsalgorithmus in $\mathbb{Q}[X]$

$$
\begin{array}{rrrr}
 & f & g & q \\
 & 3X^3 + 2X^2 + 3X & X + 1 & 3X^2 - X \\
 & \underline{-3X^2(X+1)} & & \\
 & -X^2 + 3X & & \\
 & \underline{-(-X)(X+1)} & & \\
r = & 4X & &
\end{array}
$$

Bsp. 4.5: Divisionsalgorithmus in $\mathbb{Q}[X]$

$$
\begin{array}{rrr}
 & f & g \qquad\qquad q \\
 & 3X^3 + 2X^2 + 3X & X + 1 \qquad 3X^2 - X \\
 & \underline{-3X^2(X+1)} & \\
 & -X^2 + 3X & \\
 & \underline{-(-X)(X+1)} & \\
r = & 4X &
\end{array}
$$

Bsp. 4.5: Divisionsalgorithmus in $\mathbb{Q}[X]$

$$
\begin{array}{rrr}
 & f & g \qquad\qquad q \\
 & 3X^3+2X^2+3X & X+1 \qquad 3X^2-X+4 \\
 & \underline{-3X^2(X+1)} & \\
 & -X^2+3X & \\
 & \underline{-(-X)(X+1)} & \\
r= & 4X &
\end{array}
$$

Bsp. 4.5: Divisionsalgorithmus in $\mathbb{Q}[X]$

$$
\begin{array}{rrrr}
 & f & g & q \\
 & 3X^3+2X^2+3X & X+1 & 3X^2-X+4 \\
 & \underline{-3X^2(X+1)} & & \\
 & -X^2+3X & & \\
 & \underline{-(-X)(X+1)} & & \\
r= & 4X & & \\
 & -4(X+1) & &
\end{array}
$$

Bsp. 4.5: Divisionsalgorithmus in $\mathbb{Q}[X]$

$$
\begin{array}{rrrr}
 & f & g & q \\
 & 3X^3+2X^2+3X & X+1 & 3X^2-X+4 \\
 & \underline{-3X^2(X+1)} & & \\
 & -X^2+3X & & \\
 & \underline{-(-X)(X+1)} & & \\
r= & 4X & & \\
 & -4(X+1) & &
\end{array}
$$

Bsp. 4.5: Divisionsalgorithmus in $\mathbb{Q}[X]$

$$
\begin{array}{rrr}
 & f & g \qquad\qquad q \\
 & 3X^3+2X^2+3X & X+1 \qquad 3X^2-X+4 \\
 & \underline{-3X^2(X+1)} & \\
 & -X^2+3X & \\
 & \underline{-(-X)(X+1)} & \\
 & 4X & \\
 & \underline{-4(X+1)} & \\
r = & -4 &
\end{array}
$$

Bsp. 4.5: Divisionsalgorithmus in $\mathbb{Q}[X]$

$$
\begin{array}{rrr}
 & f & g \qquad\qquad q \\
 & 3X^3+2X^2+3X & X+1 \qquad 3X^2-X+4 \\
 & \underline{-3X^2(X+1)} & \\
 & -X^2+3X & \\
 & \underline{-(-X)(X+1)} & \\
 & 4X & \\
 & \underline{-4(X+1)} & \\
r = & -4 &
\end{array}
$$

Bsp. 4.5: Divisionsalgorithmus in $\mathbb{Q}[X]$

$$
\begin{array}{rrr}
 & f & g \qquad\qquad q \\
 & 3X^3+2X^2+3X & X+1 \qquad 3X^2-X+4 \\
 & \underline{-3X^2(X+1)} & \\
 & -X^2+3X & \\
 & \underline{-(-X)(X+1)} & \\
 & 4X & \\
 & \underline{-4(X+1)} & \\
r = & -4 &
\end{array}
$$

Bsp. 4.5: Divisionsalgorithmus in $\mathbb{Q}[X]$

$$
\begin{array}{rrr}
 & f & g \qquad\qquad q \\
 & 3X^3+2X^2+3X & X+1 \qquad 3X^2-X+4 \\
 & \underline{-3X^2(X+1)} & \\
 & -X^2+3X & \\
 & \underline{-(-X)(X+1)} & \\
 & 4X & \\
 & \underline{-4(X+1)} & \\
r = & -4 &
\end{array}
$$

$$3X^3+2X^2+3X = (3X^2-X+4)(X+1)-4$$