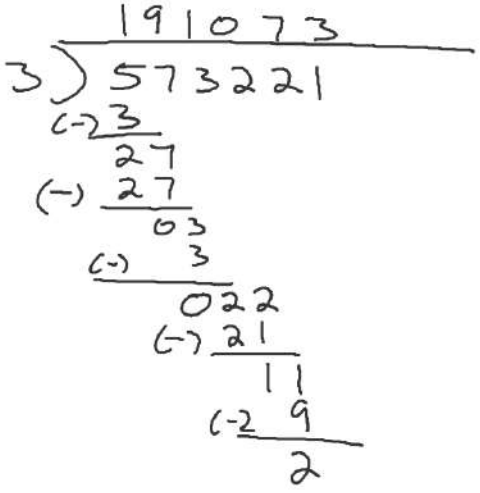
3.4 Dividing Polynomials



$191073\ \frac{2}{3}$

Divide P(x) by D(x)

$p(x) = x^3 + 5x^2 + 6x + 9$ $\quad$ $d(x) = x + 3$

$$x^2 + 2x + \frac{9}{x+3}$$

$$x+3 \overline{)\, x^3 + 5x^2 + 6x + 9}$$

$x^2 + 2x$

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

$2x^2 + 6x$

$(-)\ 2x^2 + 6x$

$0 + 9$

$$(x+3)\left(x^2+2x+\frac{9}{x+3}\right)$$

$$x^3+2x^2+\frac{9x}{x+3}$$

$$3x^2+\frac{27}{x+3}+6x$$

$$x^3+5x^2+6x+9$$

$$\frac{9x+27}{x+3}=\frac{9(x+3)}{x+3}$$

$$=9$$

Divide P(x) by D(x)

$p(x) = 2x^3 - 7x^2 - 4 \qquad d(x) = x - 3$

$$
\begin{array}{r}
2x^2 - x - 3 \\
x-3\,\overline{)\,2x^3 - 7x^2 + 0x - 4} \\
(-)\ \underline{2x^3 - 6x^2} \\
\quad -x^2 + 0x \\
(-)\ \underline{-x^2 + 3x} \\
\quad -3x - 4 \\
(-)\ \underline{-3x + 9} \\
\quad -13
\end{array}
$$

$$2x^2 - x - 3 + \frac{-13}{x-3}$$

$$2x^2 - x - 3 - \frac{13}{x-3}$$

Divide P(x) by D(x)

$p(x) = x^4 - 16$ $\quad$ $d(x) = x - 4$

$$x - 4 \;\overline{)\; x^4 + 0x^3 + 0x^2 + 0x - 16}$$

$$x^3 + 4x^2 + 16x + 64$$

$$\ominus\; x^4 - 4x^3$$

$$4x^3 + 0x^2$$

$$\ominus\; 4x^3 - 16x^2$$

$$16x^2 + 0x$$

$$16x^2 - 64x$$

$$64x - 16$$

$$64x - 256$$

$$240$$

$$x^3 + 4x^2 + 16x + 64 + \frac{240}{x-4}$$