

Sec 3.3.2

Synthetic Division

*can only be used if the divisor is linear with LC = 1

example- $x+4$ or $x-5$

Divide $5x^3 + 6x + 8$ by $x + 2$

$$\begin{array}{r|rrrr} -2 & 5 & 0 & 6 & 8 \\ & & -10 & 20 & -52 \\ \hline & 5 & -10 & 26 & -44 \end{array} \rightarrow 5x^2 - 10x + 26 - \frac{44}{x+2}$$

coefficients
of quotient
which drops 1 degree

Divide $x^3 - 7x - 6$ by $x+2$ ← divisor

$$\begin{array}{r|rrrr} -2 & 1 & 0 & -7 & -6 \\ & & -2 & 4 & 6 \\ \hline & 1 & -2 & -3 & 0 \end{array}$$

← remainder
Coefficients of our quotient

$$x^2 - 2x - 3$$

headed

$$\downarrow (x-2)(x^2-2x-3) = x^3 - 7x - 6$$

$$\begin{array}{r} 2 \\ 6 \overline{)12} \\ \underline{12} \\ 0 \end{array}$$

Suggested Practice

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multiples of 3

18. $x+2$

21. $4x^2+x+4+\frac{3}{x-1}$

24. $x^4+7x^3+21x^2+60x+182+\frac{549}{x-3}$

27. $x^4+x^3+2x^2+2x+2$

30. $x^6+2x^5+4x^4+8x^3+16x^2+32x+64$

