

Algebra II

6-3 Dividing Polynomials Using Synthetic Division

Example 1: Divide using Synthetic Division.

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

$-2 \mid 1 \quad 2 \quad -1 \quad -2$
 $\downarrow \quad -2 \quad 0 \quad 2$
 $\hline 1x^2 \quad 0x \quad -1 \quad 0$ remainder
 $x^2 - 1$

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Example 2: Synthetic Division - again.

$$(x^2 - 2x + 3) \div (x + 5)$$

$-5 \mid 1 \quad -2 \quad 3$
 $\downarrow \quad -5 \quad 35$
 $\hline 1x \quad -7 \quad 38$ remainder
 $x - 7 + \frac{38}{x+5}$

Example 3: $0x^2$

$$(x^4 - 2x^3 + 3x + 1) \div (x - 5)$$

$5 \mid 1 \quad -2 \quad 0 \quad 3 \quad 1$
 $\downarrow \quad 5 \quad 15 \quad 75 \quad 390$
 $\hline 1x^3 \quad 3x^2 \quad 15x \quad 78 \quad 391$ remainder
 $x^3 + 3x^2 + 15x + 78 + \frac{391}{x-5}$

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Example 4:

$$(2x^4 + x^3 + 5x^2 - 5x + 8) \div (x + 3)$$

$$\begin{array}{r|rrrrr} -3 & 2 & 1 & 5 & -5 & 8 \\ & & -6 & 15 & -60 & 195 \\ \hline & 2x^3 & -5x^2 & 20x & -65 & 203 \end{array}$$

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Example 5: Synthetic Substitution

$$p(x) = 2x^3 + 5x^2 - x + 7 \text{ for } x = 2 \text{ (Find } p(2)\text{.)}$$

$$\begin{array}{r|rrrr} 2 & 2 & 5 & -1 & 7 \\ & & 4 & 18 & 34 \\ \hline & 2 & 9 & 17 & 41 \end{array}$$

$$2x^3 + 9x + 17 + \frac{41}{x-2}$$

$$2(2)^3 + 5(2)^2 - 2 + 7$$

$$41$$

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Conclusion

1. What is the first step in synthetic division? *Change sign of # dividing by*
2. Is it important on how we line up our numbers? *yes*
3. Do you have any QUESTIONS?

Replace missing exponents with zero

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Teacher: Why didn't you do your homework?

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