

Synthetic Division Practice

Name _____

Directions: Divide the polynomials using **synthetic division**. Make sure that the polynomial is in descending order (standard form). If one of the terms is missing, you must put a placeholder of 0 in its place.

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

$$\begin{array}{r|rrr} -3 & 1 & 5 & 1 \\ & \downarrow & & \\ & & -3 & -6 \\ \hline & 1 & 2 & -5 \end{array}$$

1) $x + 2 - \frac{5}{x+3}$

Is $(x + 3)$ a factor of the polynomial? Why or why not?

No, there is a remainder

2. $(2x^3 - 11x^2 + 9x - 20) \div (x - 5)$

$$\begin{array}{r|rrrr} 5 & 2 & -11 & 9 & -20 \\ & \downarrow & & & \\ & & 10 & -5 & 20 \\ \hline & 2 & -1 & 4 & 0 \end{array}$$

2) $2x^2 - x + 4$

Is $(x - 5)$ a factor of the polynomial? Why or why not?

yes, the remainder is zero

3. $(2x^3 + 4x^2 - 3x - 6) \div (x + 3)$

$$\begin{array}{r}
 \underline{-3} \quad | \quad 2 \quad 4 \quad -3 \quad -6 \\
 \phantom{\underline{-3} \quad |} \downarrow \\
 \phantom{\underline{-3} \quad |} \quad -6 \quad 6 \quad -9 \\
 \phantom{\underline{-3} \quad |} \quad \quad \quad \\
 \phantom{\underline{-3} \quad |} \quad -2 \quad 3 \quad -15
 \end{array}$$

3) $2x^2 - 2x + 3 - \frac{15}{x+3}$

Is $(x + 3)$ a factor of the polynomial? Why or why not?

No, there is a remainder

4. $(2x^3 - 11x^2 + 13x - 44) \div (x - 5)$

$$\begin{array}{r}
 \underline{5} \quad | \quad 2 \quad -11 \quad 13 \quad -44 \\
 \phantom{\underline{5} \quad |} \downarrow \\
 \phantom{\underline{5} \quad |} \quad 10 \quad -5 \quad 40 \\
 \phantom{\underline{5} \quad |} \quad \quad \quad \\
 \phantom{\underline{5} \quad |} \quad -1 \quad 8 \quad -4
 \end{array}$$

4) $2x^2 - x + 8 - \frac{4}{x-5}$

Is $(x - 5)$ a factor of the polynomial? Why or why not?

No, there is a remainder

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

<u>2</u>	2	3	-4	
	↓	4	14	
	2	7	10	

5) $2x + 7 + \frac{10}{x-2}$

6. $(n^4 + 5n^3 - 6n + 3) \div (n + 3)$

<u>-3</u>	1	5	0	-6	3	
	↓	-3	-6	18	-36	
	1	2	-6	12	-33	

6) $n^3 + 2n^2 - 6n + 12 - \frac{33}{n+3}$

Use **SYNTHETIC DIVISION** to divide the following. **DON'T FORGET TO PUT PLACEHOLDERS IN FOR #7-8.**

7. $(x^3 - 125) \div (x - 5)$

$$\begin{array}{r|rrrr}
 5 & 1 & 0 & 0 & -125 \\
 & \downarrow & & & \\
 & & 5 & 25 & 125 \\
 \hline
 & 1 & 5 & 25 & 0
 \end{array}$$

7) $x^2 + 5x + 25$

8. $(5x^4 + 2x^2 - 15x + 10) \div (x + 2)$

$$\begin{array}{r|rrrrr}
 -2 & 5 & 0 & 2 & -15 & 10 \\
 & \downarrow & & & & \\
 & & -10 & 20 & -44 & 118 \\
 \hline
 & 5 & -10 & 22 & -59 & 128
 \end{array}$$

8) $5x^3 - 10x^2 + 22x - 59 + \frac{128}{x+2}$

