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Date \_\_\_\_\_  
Algebra 2

## Dividing Polynomials With $(x + a)$

Divide each of the following polynomials using synthetic division

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

$$\begin{array}{r|rrr} -4 & 1 & 3 & -4 \\ & & -4 & 4 \\ \hline & 1 & -1 & 0 \end{array}$$

$x - 1$

2.  $\frac{x^2 + 7x + 5}{x + 1}$

$$\begin{array}{r|rrr} -1 & 1 & 7 & 5 \\ & & -1 & -6 \\ \hline & 1 & 6 & -1 \end{array}$$

$x + 6 - \frac{1}{x + 1}$

3.  $\frac{x^2 - 10x - 21}{x + 2}$

$$\begin{array}{r|rrr} -2 & 1 & -10 & -21 \\ & & -2 & 24 \\ \hline & 1 & -12 & 3 \end{array}$$

$x - 12 + \frac{3}{x + 2}$

4.  $\frac{-x^2 - 8x + 33}{x + 10}$

$$\begin{array}{r|rrr} -10 & -1 & -8 & 33 \\ & & 10 & -20 \\ \hline & -1 & 2 & 13 \end{array}$$

$x + 2 + \frac{13}{x + 10}$

5.  $\frac{5x^4 + 17x^3 + 10x^2 - 5}{x + 3}$

$$\begin{array}{r|rrrrr} -3 & 5 & 17 & 10 & 0 & -5 \\ & & -15 & -6 & -12 & 36 \\ \hline & 5 & 2 & 4 & -12 & 31 \end{array}$$

$5x^3 + 2x^2 + 4x - 12 + \frac{31}{x + 3}$

6.  $\frac{2x^4 - 3x^3 + 6x^2 - 5}{x + 3}$

$$\begin{array}{r|rrrrr} -3 & 2 & -3 & 6 & 0 & -5 \\ & & -6 & 27 & -99 & 297 \\ \hline & 2 & -9 & 33 & -99 & 292 \end{array}$$

$2x^3 - 9x^2 + 33x - 99 + \frac{292}{x + 3}$

7.  $\frac{2x^3 - x - 2}{x - 4}$

8.  $\frac{2x^3 - 3x^2 + 2x + 5}{x - 5}$

$$\begin{array}{r|rrrr} 4 & 2 & 0 & -1 & -2 \\ & & 8 & 32 & 124 \\ \hline & 2 & 8 & 31 & 122 \end{array}$$

$2x^2 + 8x + 31 + \frac{122}{x - 4}$

$$\begin{array}{r|rrrr} 5 & 2 & -3 & 2 & 5 \\ & & 10 & 35 & 185 \\ \hline & 2 & 7 & 37 & 190 \end{array}$$

$2x^2 + 7x + 37 + \frac{190}{x - 5}$

$$9. \frac{x^3 + 5x^2 - 1}{x+2}$$

$$\begin{array}{r|rrrr} -2 & 1 & 5 & 0 & -1 \\ & & -2 & -6 & 12 \\ \hline & 1 & 3 & -6 & 11 \end{array}$$

$$x^2 + 3x - 6 + \frac{11}{x+2}$$

$$11. \frac{2x^3 + 5x^2 - 31x - 84}{x+3}$$

$$\begin{array}{r|rrrrr} -3 & 2 & 5 & -31 & -84 \\ & & -6 & 3 & 84 \\ \hline & 2 & -1 & -28 & 0 \end{array}$$

$$2x^2 - x - 28$$

$$13. \frac{6x^3 - 5x + 3}{x-3}$$

$$\begin{array}{r|rrrr} 3 & 6 & 0 & -5 & 3 \\ & & 18 & 54 & 147 \\ \hline & 6 & 18 & 49 & 150 \end{array}$$

$$6x^2 + 18x + 49 + \frac{150}{x-3}$$

$$15. \frac{x^2 + x - 4}{x-3}$$

$$\begin{array}{r|rr} 3 & 1 & 1 & -4 \\ & & 3 & 12 \\ \hline & 1 & 4 & 8 \end{array}$$

$$x + 4 + \frac{8}{x-3}$$

$$10. \frac{x^4 - 2x^2 - 7x + 12}{x+6}$$

$$\begin{array}{r|rrrrr} -6 & 1 & 0 & -2 & -7 & 12 \\ & & -6 & 36 & -204 & 1266 \\ \hline & 1 & -6 & 34 & -211 & 1278 \end{array}$$

$$x^3 - 6x^2 + 34x - 211 + \frac{1278}{x+6}$$

$$12. \frac{4x^3 + 12x^2 - 5}{x+5}$$

$$\begin{array}{r|rrrr} -5 & 4 & 12 & 0 & -5 \\ & & -20 & 40 & -200 \\ \hline & 4 & -8 & 40 & -205 \end{array}$$

$$4x^2 - 8x + 40 - \frac{205}{x+5}$$

$$14. \frac{5x^3 - 60}{x-2}$$

$$\begin{array}{r|rrrr} 2 & 5 & 0 & 0 & -60 \\ & & 10 & 20 & 40 \\ \hline & 5 & 10 & 20 & -20 \end{array}$$

$$5x^2 + 10x + 20 - \frac{20}{x-2}$$

$$16. \frac{-3x^2 + 10x - 6}{x+1}$$

$$\begin{array}{r|rr} -1 & -3 & 10 & -6 \\ & & 3 & -13 \\ \hline & -3 & 13 & -19 \end{array}$$

$$-3x + 13 - \frac{19}{x+1}$$