

Algebra 2

Worksheet 4.3

Use Long Division to simplify.

1. $2x^2 - 9x - 5 \div x - 5$

$$\begin{array}{r} 2x+1 \\ x-5 \overline{) 2x^2-9x-5} \\ \underline{-2x^2+10x} \\ x-5 \\ \underline{-x+5} \\ 0 \end{array}$$

3. $2x^3 + 5x^2 - x - 6 \div x + 2$

$$\begin{array}{r} 2x^2+x-3 \\ x+2 \overline{) 2x^3+5x^2-x-6} \\ \underline{-2x^3+4x^2} \\ x^2-x \\ \underline{-x^2+2x} \\ -3x-6 \\ \underline{+3x+6} \\ 0 \end{array}$$

5. $4x^3 - 6x^2 - 5x - 1 \div x - 3$

$$\begin{array}{r} 4x^2+6x+13+\frac{38}{x-3} \\ x-3 \overline{) 4x^3-6x^2-5x-1} \\ \underline{-4x^3+12x^2} \\ 6x^2-5x-1 \\ \underline{-6x^2+18x} \\ 13x-1 \\ \underline{-13x+39} \\ 38 \end{array}$$

Use Synthetic Division to simplify.

7. $2x^3 - 7x^2 - 24x + 45 \div x - 5 = 0$
 $x=5$

$$\begin{array}{r} 5 \overline{) 2 \quad -7 \quad -24 \quad 45} \\ \underline{10 \quad 15 \quad -45} \\ 2 \quad 3 \quad -9 \quad 0 \end{array}$$

$2x^2 + 3x - 9$

9. $4x^4 + 2x^2 - 3x + 1 \div x + 3 = 0$

$$\begin{array}{r} -3 \overline{) 4 \quad 0 \quad 2 \quad -3 \quad 1} \\ \underline{-12 \quad 36 \quad -114 \quad 351} \\ 4 \quad -12 \quad 38 \quad -117 \quad 352 \end{array}$$

$x = -3$

$$4x^3 - 12x^2 + 38x - 117 + \frac{352}{x+3}$$

2. $3x^2 - 13x + 12 \div x - 3$

$$\begin{array}{r} 3x-4 \\ x-3 \overline{) 3x^2-13x+12} \\ \underline{-3x^2+9x} \\ -4x+12 \\ \underline{+4x-12} \\ 0 \end{array}$$

4. $3x^3 + 6x^2 - 2x - 7 \div x + 4$

$$\begin{array}{r} 3x^2-6x+22+\frac{95}{x+4} \\ x+4 \overline{) 3x^3+6x^2-2x-7} \\ \underline{-3x^3+12x^2} \\ 6x^2-2x-7 \\ \underline{+6x^2+24x} \\ 22x-7 \\ \underline{-22x+88} \\ -95 \end{array}$$

6. $5x^4 + 2x^3 - x - 2 \div x^2 + x - 3$

$$\begin{array}{r} 5x^2+17x+51x+152+\frac{454}{x-3} \\ x-3 \overline{) 5x^4+2x^3-1x-2} \\ \underline{-5x^4+15x^3} \\ 17x^3+0x^2-1x-2 \\ \underline{-17x^3+51x^2} \\ 51x^2-x-2 \\ \underline{-51x^2+153x} \\ 152x-2 \\ \underline{-152x+456} \\ 454 \end{array}$$

8. $3x^3 + 17x^2 + 18x - 8 \div x + 4 = 0$

$$\begin{array}{r} -4 \overline{) 3 \quad 17 \quad 18 \quad -8} \\ \underline{-12 \quad -20 \quad 8} \\ 3 \quad 5 \quad -2 \quad 0 \end{array}$$

$x = -4$

$3x^2 + 5x - 2$

10. $3x^5 + x^4 - x^2 + 2x - 6 \div x - 4 = 0$

$$\begin{array}{r} 4 \overline{) 3 \quad 1 \quad 0 \quad -1 \quad 2 \quad -6} \\ \underline{12 \quad 52 \quad 208 \quad 828 \quad 3320} \\ 3 \quad 13 \quad 52 \quad 207 \quad 830 \quad 3314 \end{array}$$

$x = 4$

$$3x^4 + 13x^3 + 52x^2 + 207x + 830 + \frac{3314}{x-4}$$