

GSE Algebra II  
Synthetic Division

Name: Key

Divide using synthetic division.

1.  $(x^3 - 7x - 6) \div (x - 2)$

$$\begin{array}{r|rrrr} 2 & 1 & 0 & -7 & -6 \\ & \downarrow & 2 & 4 & -6 \\ \hline & 1 & 2 & -3 & -12 \end{array}$$

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

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

$$\begin{array}{r|rrr} -1 & 4 & 5 & -4 \\ & \downarrow & -4 & -1 \\ \hline & 4 & 1 & -5 \end{array}$$

$$\boxed{4x + 1 - \frac{5}{x+1}}$$

3.  $(2x^2 + 7x + 8) \div (x - 2)$

$$\begin{array}{r|rrr} 2 & 2 & 7 & 8 \\ & \downarrow & 4 & 22 \\ \hline & 2 & 11 & 30 \end{array}$$

$$\boxed{2x + 11 + \frac{30}{x-2}}$$

4.  $(x^2 + 10) \div (x + 4)$

$$\begin{array}{r|rr} -4 & 1 & 10 \\ & \downarrow & -4 & 16 \\ \hline & 1 & -4 & 26 \end{array}$$

$$x^2 - 4 + \frac{26}{x+4}$$

5.  $(10x^4 + 5x^3 + 4x^2 - 9) \div (x + 1)$

$$\begin{array}{r|rrrrr} -1 & 10 & 5 & 4 & 0 & -9 \\ & \downarrow & -10 & 5 & -9 & 9 \\ \hline & 10 & -5 & 9 & -9 & 0 \end{array}$$

$$\boxed{10x^3 - 5x^2 + 9x - 9}$$

6.  $(x^3 - 14x + 8) \div (x + 4)$

$$\begin{array}{r|rrrr} -4 & 1 & 0 & -14 & 8 \\ & \downarrow & -4 & 16 & -8 \\ \hline & 1 & -4 & 2 & 0 \end{array}$$

$$\boxed{x^2 - 4x + 2}$$

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

$$\begin{array}{r|rr} 2 & 1 & -4 & 3 \\ & \downarrow & 2 & -4 \\ \hline & 1 & -2 & -1 \end{array}$$

$$\boxed{x^2 - 2x - \frac{1}{x-2}}$$

8.  $(x^4 - 6x^3 - 40x + 33) \div (x - 7)$

$$\begin{array}{r|rrrrr} 7 & 1 & -6 & 0 & -40 & 33 \\ & \downarrow & 7 & 7 & 14 & -161 \\ \hline & 1 & 1 & 7 & -26 & -128 \end{array}$$

$$x^3 + x^2 + 7x - 26 - \frac{128}{x-7}$$

9.  $(2x^4 - 6x^3 + x^2 - 3x - 3) \div (x - 3)$

$$\begin{array}{r} 3 \overline{) 2 \ -6 \ 1 \ -3 \ -3} \\ \underline{\downarrow 6 \ 0 \ 3 \ 0} \\ 2 \ 0 \ 1 \ 0 \ -3 \end{array}$$

$$\boxed{2x^3 + x - \frac{3}{x-3}}$$

10.  $(y^3 + 6y^2 + 12y + 8) \div (y + 2)$

$$\begin{array}{r} -2 \overline{) 1 \ 6 \ 12 \ 8} \\ \underline{\downarrow -2 \ -8 \ -8} \\ 1 \ 4 \ 4 \ 0 \end{array}$$

$$\boxed{y^2 + 4y + 4}$$

11.  $(x^3 - 8) \div (x - 2)$

$$\begin{array}{r} 2 \overline{) 1 \ 0 \ 0 \ -8} \\ \underline{\downarrow 2 \ 4 \ 8} \\ 1 \ 2 \ 4 \ 0 \end{array}$$

$$\boxed{x^2 + 2x + 4}$$

12.  $(t^3 - t^2 + t - 1) \div (t - 1)$

$$\begin{array}{r} 1 \overline{) 1 \ -1 \ 1 \ -1} \\ \underline{\downarrow 1 \ 0 \ 1} \\ 1 \ 0 \ 1 \ 0 \end{array}$$

$$\boxed{t^2 + 1}$$

13.  $(x^2 + 4x - 14) \div (x + 6)$

$$\begin{array}{r} -6 \overline{) 1 \ 4 \ -14} \\ \underline{\downarrow -6 \ 12} \\ 1 \ -2 \ -2 \end{array}$$

$$\cancel{xxxx} \quad \boxed{x - 2 - \frac{2}{x+6}}$$

14.  $(x^4 - 81) \div (x - 3)$

$$\begin{array}{r} 3 \overline{) 1 \ 0 \ 0 \ 0 \ -81} \\ \underline{\downarrow 3 \ 9 \ 27 \ 81} \\ 1 \ 3 \ 9 \ 27 \ 63 \end{array}$$

$$\boxed{x^3 + 3x^2 + 9x + 27 - \frac{63}{x-3}}$$