

GSE Algebra II  
Synthetic Division

Divide using synthetic division.

1.  $(x^3 - 7x - 6) \div (x - 2)$   $x - 2 = 0$   
 $x = 2$

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

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

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.  $(2x^2 + 7x + 8) \div (x - 2)$   $x - 2 = 0$   
 $x = 2$

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

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

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

$$\begin{array}{r|rrr} -4 & 1 & 0 & 10 \\ & \downarrow & -4 & 16 \\ \hline & 1 & -4 & 26 \end{array}$$

$$\boxed{x - 4 + \frac{26}{x+4}}$$

Name: Odd Solutions

5.  $(10x^4 + 5x^3 + 4x^2 - 9) \div (x + 1)$   $x + 1 = 0$   
 $x = -1$

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

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

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.  $(x^2 - 4x + 3) \div (x - 2)$   $x - 2 = 0$   
 $x = 2$

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

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

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

$$\begin{array}{r|rrrrr} 7 & 1 & -6 & 0 & -40 & 33 \\ & \downarrow & 7 & 7 & 49 & 63 \\ \hline & 1 & 1 & 7 & 9 & 96 \end{array}$$

$$\boxed{x^3 + x^2 + 7x + 9 + \frac{96}{x-7}}$$

2. long division

$$\begin{array}{r} 4x + 1 - \frac{5}{x+1} \\ x+1 \overline{) 4x^2 + 5x - 4} \\ \underline{-4x^2 + 4x} \phantom{-4} \\ \phantom{4x^2} + 9x - 4 \\ \underline{-9x + 9} \\ \phantom{4x^2} \phantom{+ 9x} - 13 \end{array}$$

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

$x-3=0$   
 $x=3$

$$\begin{array}{r|rrrrr} 3 & 2 & -6 & 1 & -3 & -3 \\ & \downarrow & & & & \\ & 6 & 0 & 3 & 0 & \\ \hline & 2 & 0 & 1 & 0 & -3 \end{array}$$

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

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

$18y$

$$\begin{array}{r|rrrr} -2 & 1 & 0 & 18 & 8 \\ & \downarrow & -2 & 4 & -44 \\ \hline & 1 & -2 & 22 & -36 \end{array}$$

$$\boxed{y^2 - 2y + 22 - \frac{36}{y+2}}$$

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

$x-2=0$   
 $x=2$

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

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

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

$$\begin{array}{r|rrrr} 1 & 1 & -1 & 1 & -1 \\ & \downarrow & & & \\ & 1 & 0 & 1 & 0 \end{array}$$

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

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

$x+6=0$   
 $x=-6$

$$\begin{array}{r|rrr} -6 & 1 & 4 & -14 \\ & \downarrow & -6 & 12 \\ \hline & 1 & -2 & -2 \end{array}$$

$$\boxed{x - 2 - \frac{2}{x+6}}$$

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

$$\begin{array}{r|rrrrr} 3 & 1 & 0 & 0 & 0 & -81 \\ & \downarrow & 3 & 9 & 27 & 81 \\ \hline & 1 & 3 & 9 & 27 & 0 \end{array}$$

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