

Complete as many of the following problems as you can with your group. You do not have to go in order. Each person will be given two specific problems that they must complete and present to either Professor MG or to Stefanie before they leave.

(1) Divide $\frac{x^3+1}{x-1}$

Solution

$$\begin{array}{r}
 + x + 1 \\
 x-1 \overline{) x^3 x^2 x 1} \\
 \underline{-x^3 + x^2} \\
 x^2 \\
 \underline{-x^2 + x} \\
 x + 1 \\
 \underline{-x + 1} \\
 2
 \end{array}$$

□

(2) Divide $\frac{x^6+64}{x-2}$

Solution

$$\begin{array}{r}
 + 2x^4 + 4x^3 + 8x^2 + 16x + 32 \\
 x-2 \overline{) x^6 2x^5 4x^4 8x^3 16x^2 32x 64} \\
 \underline{-x^6 + 2x^5} \\
 2x^5 \\
 \underline{-2x^5 + 4x^4} \\
 4x^4 \\
 \underline{-4x^4 + 8x^3} \\
 8x^3 \\
 \underline{-8x^3 + 16x^2} \\
 16x^2 \\
 \underline{-16x^2 + 32x} \\
 32x + 64 \\
 \underline{-32x + 64} \\
 128
 \end{array}$$

□

(3) Divide $\frac{x^2-8x+4}{x-3}$

Solution

$$\begin{array}{r} x - 5 \\ x - 3 \overline{) x^2 - 8x + 4} \\ \underline{-x^2 + 3x} \\ -5x + 4 \\ \underline{5x - 15} \\ -11 \end{array}$$

□

(4) Divide $\frac{x^2-6x-2}{x+5}$

Solution

$$\begin{array}{r} x - 11 \\ x + 5 \overline{) x^2 - 6x - 2} \\ \underline{-x^2 - 5x} \\ -11x - 2 \\ \underline{11x + 55} \\ 53 \end{array}$$

□

(5) Divide $\frac{27x^3+9x^2-3x-9}{3x-2}$

Solution

$$\begin{array}{r} 9x^2 + 9x + 5 \\ 3x - 2 \overline{) 27x^3 + 9x^2 - 3x - 9} \\ \underline{-27x^3 + 18x^2} \\ 27x^2 - 3x - 9 \\ \underline{-27x^2 + 18x} \\ 15x - 9 \\ \underline{-15x + 10} \\ 1 \end{array}$$

□

(6) Divide $\frac{x^6-64}{x-2}$

Solution

$$\begin{array}{r}
 x^5 + 2x^4 + 4x^3 + 8x^2 + 16x + 32 \\
 x-2 \overline{) x^6 - 64} \\
 \underline{-x^6 + 2x^5} - 64 \\
 2x^5 - 64 \\
 \underline{-2x^5 + 4x^4} - 64 \\
 4x^4 - 64 \\
 \underline{-4x^4 + 8x^3} - 64 \\
 8x^3 - 64 \\
 \underline{-8x^3 + 16x^2} - 64 \\
 16x^2 - 64 \\
 \underline{-16x^2 + 32x} \\
 32x - 64 \\
 \underline{-32x + 64} \\
 0
 \end{array}$$

□

(7) Divide $(12x^2 + 7x - 4) \div (4x - 3)$

Solution

$$\begin{array}{r}
 3x + 4 \\
 4x-3 \overline{) 12x^2 + 7x - 4} \\
 \underline{-12x^2 + 9x} \\
 16x - 4 \\
 \underline{-16x + 12} \\
 8
 \end{array}$$

□

(8) Divide $(9x^3 - 3x^2 - 5x - 25) \div (3x - 5)$

Solution

$$\begin{array}{r}
 3x^2 + 4x + 5 \\
 3x-5 \overline{) 9x^3 - 3x^2 - 5x - 25} \\
 \underline{-9x^3 + 15x^2} - 25 \\
 12x^2 - 5x - 25 \\
 \underline{-12x^2 + 20x} \\
 15x - 25 \\
 \underline{-15x + 25} \\
 0
 \end{array}$$

□

(9) Divide $\frac{4x^3+17x^2+12x-2}{x+4}$

Solution

$$\begin{array}{r}
 4x^2 + x + 8 \\
 x + 4 \overline{) 4x^3 + 17x^2 + 12x - 2} \\
 \underline{-4x^3 - 16x^2} \\
 x^2 + 12x \\
 \underline{-x^2 - 4x} \\
 8x - 2 \\
 \underline{-8x - 32} \\
 -34
 \end{array}$$

□

(10) Divide $(2x^4 + 5x^3 + 7x^2 + 16x + 15) \div (2x + 3)$

Solution

$$\begin{array}{r}
 x^3 + x^2 + 2x + 5 \\
 2x + 3 \overline{) 2x^4 + 5x^3 + 7x^2 + 16x + 15} \\
 \underline{-2x^4 - 3x^3} \\
 2x^3 + 7x^2 \\
 \underline{-2x^3 - 3x^2} \\
 4x^2 + 16x \\
 \underline{-4x^2 - 6x} \\
 10x + 15 \\
 \underline{-10x - 15} \\
 0
 \end{array}$$

□

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

Solution

$$\begin{array}{r}
 3x - 5 \\
 x^2 + 2x + 1 \overline{) 3x^3 + x^2 + 2x + 5} \\
 \underline{-3x^3 - 6x^2 - 3x} \\
 -5x^2 - x + 5 \\
 \underline{5x^2 + 10x + 5} \\
 9x + 10
 \end{array}$$

□

