

HW 2 - Long Division

Name Key Spring 17

Determine whether each binomial is a factor of  $x^3 + 3x^2 - 10x - 24$ .

1.  $x + 4$

$$\begin{array}{r} x^2 - x - 6 \\ x+4 \overline{) x^3 + 3x^2 - 10x - 24} \\ \underline{x^2 + 4x} \phantom{-24} \\ -x^2 - 10x \phantom{-24} \\ \underline{-x^2 - 4x} \phantom{-24} \\ -6x - 24 \\ \underline{-6x - 24} \\ 0 \end{array}$$

**YES**

2.  $x - 3$

$$\begin{array}{r} x^2 + 6x + 8 \\ x-3 \overline{) x^3 + 3x^2 - 10x - 24} \\ \underline{x^3 - 3x^2} \phantom{-24} \\ 6x^2 - 10x \phantom{-24} \\ \underline{6x^2 - 18x} \phantom{-24} \\ 8x - 24 \\ \underline{8x - 24} \\ 0 \end{array}$$

**YES**

3.  $x + 6$

$$\begin{array}{r} x^2 - 3x + 8 \\ x+6 \overline{) x^3 + 3x^2 - 10x - 24} \\ \underline{x^3 + 6x^2} \phantom{-24} \\ -3x^2 - 10x \phantom{-24} \\ \underline{-3x^2 - 18x} \phantom{-24} \\ 8x - 24 \\ \underline{8x + 48} \\ -72 \end{array}$$

**NO**

4.  $x + 2$

$$\begin{array}{r} x^2 + x - 12 \\ x+2 \overline{) x^3 + 3x^2 - 10x - 24} \\ \underline{x^3 + 2x^2} \phantom{-24} \\ x^2 - 10x \phantom{-24} \\ \underline{x^2 + 2x} \phantom{-24} \\ -12x - 24 \\ \underline{-12x - 24} \\ 0 \end{array}$$

**YES**

Divide using Long Division.

5.  $(x^2 - 13x - 48) \div (x + 3)$

$$\begin{array}{r} x - 16 \\ x+3 \overline{) x^2 - 13x - 48} \\ \underline{x^2 + 3x} \phantom{-48} \\ -16x - 48 \\ \underline{-16x - 48} \\ 0 \end{array}$$

**$x - 16$**

6.  $(2x^2 + x - 7) \div (x - 5)$

$$\begin{array}{r} 2x + 11 \\ x-5 \overline{) 2x^2 + x - 7} \\ \underline{2x^2 - 10x} \phantom{-7} \\ 11x - 7 \\ \underline{11x - 55} \\ 48 \end{array}$$

**$2x + 11 + \frac{48}{x-5}$**

7.  $(x^3 + 5x^2 - 3x - 1) \div (x - 1)$

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

**$x^2 + 6x + 3 + \frac{2}{x-1}$**

8.  $(3x^3 - x^2 - 7x + 6) \div (x + 2)$

$$\begin{array}{r} 3x^2 - 7x + 7 \\ x+2 \overline{) 3x^3 - x^2 - 7x + 6} \\ \underline{3x^3 + 6x^2} \phantom{-7x + 6} \\ -7x^2 - 7x \phantom{+ 6} \\ \underline{-7x^2 - 14x} \phantom{+ 6} \\ 7x + 6 \\ \underline{7x + 14} \\ -8 \end{array}$$

**$3x^2 - 7x + 7 - \frac{8}{x+2}$**

9.  $(6x^3 + 2x^2 - 11x + 12) \div (3x + 4)$

$$\begin{array}{r} 2x^2 - 2x - 1 \\ 3x+4 \overline{) 6x^3 + 2x^2 - 11x + 12} \\ \underline{6x^3 + 8x^2} \phantom{-11x + 12} \\ -6x^2 - 11x \phantom{+ 12} \\ \underline{-6x^2 - 8x} \phantom{+ 12} \\ -3x + 12 \\ \underline{-3x - 4} \\ 16 \end{array}$$

**$2x^2 - 2x - 1 + \frac{16}{3x+4}$**

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

$$\begin{array}{r} x^3 + 3x^2 + 3x + 4 \\ x-1 \overline{) x^4 + 2x^3 + 0x^2 + x - 3} \\ \underline{x^4 + x^3} \phantom{+ 0x^2 + x - 3} \\ 3x^3 + 0x^2 \phantom{+ x - 3} \\ \underline{3x^3 - 3x^2} \phantom{+ x - 3} \\ 3x^2 + x \phantom{- 3} \\ \underline{3x^2 - 3x} \phantom{- 3} \\ 4x - 3 \\ \underline{4x - 4} \\ 1 \end{array}$$

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

11.  $(2x^4 + 3x^3 - 4x^2 + x + 1) \div (2x - 1)$

$$\begin{array}{r} x^3 + 2x^2 - x \\ 2x-1 \overline{) 2x^4 + 3x^3 - 4x^2 + x + 1} \\ \underline{2x^4 - x^3} \phantom{- 4x^2 + x + 1} \\ 4x^3 - 4x^2 \phantom{+ x + 1} \\ \underline{4x^3 - 2x^2} \phantom{+ x + 1} \\ -2x^2 + x \phantom{+ 1} \\ \underline{-2x^2 + x} \phantom{+ 1} \\ 1 \end{array}$$

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

12.  $(x^3 + 7x^2 + 12x - 3) \div (x + 5)$

$$\begin{array}{r} x^2 + 2x + 2 \\ x+5 \overline{) x^3 + 7x^2 + 12x - 3} \\ \underline{x^3 + 5x^2} \phantom{+ 12x - 3} \\ 2x^2 + 12x \phantom{- 3} \\ \underline{2x^2 + 10x} \phantom{- 3} \\ 2x - 3 \\ \underline{2x + 10} \\ -13 \end{array}$$

**$x^2 + 2x + 2 - \frac{13}{x+5}$**