

Steps to Long Division of Polynomials

- 1) Write as a division problem (in standard form)
- 2) $\frac{\text{1st term inside}}{\text{1st term outside}} = \text{write \# on top}$
- 3) Multiply top # to both outside terms
- 4) Draw your line & change your signs (add up & down)
- 5) Bring down & repeat as needed

EX: $m-8 \overline{) m^2 - 7m - 11}$

$$\begin{array}{r} m+1-\frac{3}{m-8} \\ m-8 \overline{) m^2 - 7m - 11} \\ \underline{-m^2 + 8m} \\ m - 11 \\ \underline{-m + 8} \\ -3 \end{array}$$
$$\frac{m^2}{m} = m$$
$$\frac{m}{m} = 1$$

Dividing Polynomials

Divide.

$$1) (m^2 - 7m - 11) \div (m - 8)$$

$$\begin{array}{r} m-8 \overline{) m^2 - 7m - 11} \\ \underline{-m^2 + 8m} \\ 15m - 11 \\ \underline{-15m + 120} \\ -131 \end{array}$$

$$\frac{m^2}{m} = m$$

$$\frac{15m}{m} = 15$$

$$2) (n^2 - n - 29) \div (n - 6)$$

$$\begin{array}{r} n-6 \overline{) n^2 - n - 29} \\ \underline{-n^2 + 6n} \\ 5n - 29 \\ \underline{-5n + 30} \\ 1 \end{array}$$

$$\frac{n^2}{n} = n$$

$$\frac{5n}{n} = 5$$

$$3) (n^2 + 10n + 18) \div (n + 5)$$

$$\begin{array}{r} n+5 \overline{) n^2 + 10n + 18} \\ \underline{-n^2 + 5n} \\ 15n + 18 \\ \underline{-15n + 75} \\ -57 \end{array}$$

$$\frac{n^2}{n} = n$$

$$\frac{15n}{n} = 15$$

$$4) (k^2 - 7k + 10) \div (k - 1)$$

$$\begin{array}{r} k-1 \overline{) k^2 - 7k + 10} \\ \underline{-k^2 + k} \\ -6k + 10 \\ \underline{+6k - 6} \\ 16 \end{array}$$

$$\frac{k^2}{k} = k$$

$$\frac{-6k}{k} = -6$$

$$5) (n^2 - 3n - 21) \div (n - 7)$$

$$\begin{array}{r} n-7 \overline{) n^2 - 3n - 21} \\ \underline{-n^2 + 7n} \\ 10n - 21 \\ \underline{-10n + 70} \\ 49 \end{array}$$

$$\frac{n^2}{n} = n$$

$$\frac{10n}{n} = 10$$

$$6) (a^2 - 28) \div (a - 5)$$

$$\begin{array}{r} a-5 \overline{) a^2 + 0a - 28} \\ \underline{-a^2 + 5a} \\ 5a - 28 \\ \underline{-5a + 25} \\ -3 \end{array}$$

$$\frac{a^2}{a} = a$$

$$\frac{5a}{a} = 5$$

$$7) (r^2 + 14r + 38) \div (r + 8)$$

$$\begin{array}{r} r+8 \overline{) r^2 + 14r + 38} \\ \underline{-r^2 - 8r} \\ 22r + 38 \\ \underline{-22r - 176} \\ -138 \end{array}$$

$$\frac{r^2}{r} = r$$

$$\frac{22r}{r} = 22$$

$$8) (x^2 + 5x + 3) \div (x + 6)$$

$$\begin{array}{r} x+6 \overline{) x^2 + 5x + 3} \\ \underline{-x^2 - 6x} \\ 11x + 3 \\ \underline{-11x - 66} \\ -63 \end{array}$$

$$\frac{x^2}{x} = x$$

$$\frac{11x}{x} = 11$$

$$9) (2x^2 - 17x - 38) \div (2x + 3)$$

$$\begin{array}{r} 2x+3 \overline{) 2x^2 - 17x - 38} \\ \underline{-2x^2 + 3x} \\ -20x - 38 \\ \underline{+20x + 30} \\ -8 \end{array}$$

$$\frac{2x^2}{2x} = x$$

$$\frac{-20x}{2x} = -10$$

$$10) (42x^2 - 33) \div (7x + 7)$$

$$\begin{array}{r} 7x+7 \overline{) 42x^2 + 0x - 33} \\ \underline{-42x^2 + 42x} \\ -42x - 33 \\ \underline{+42x + 42} \\ 9 \end{array}$$

$$\frac{42x^2}{7x} = 6x$$

$$\frac{-42x}{7x} = -6$$