

Polynomial Long Division Practice

Find the quotient of the problem below. State if the divisor is a factor of the dividend. Then state the division algorithm as it relates to the problem

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

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

~~$2x+3$ is a factor of $2x^3 - x^2 - 2x + 6$~~

~~Division Algorithm~~

~~$$(2x+3)(x^2 - 2x + 2) + 0 = 2x^3 - x^2 - 2x + 6$$~~

Find the quotient of the problem below. State if the divisor is a factor of the dividend. Then state the division algorithm as it relates to the problem

$$\frac{2x^4 - 9x^3 + 13x^2 - 8x + 3}{2x - 3}$$

$$\begin{array}{r} \boxed{x^3 - 3x^2 + 2x - 1} \\ 2x-3 \overline{) 2x^4 - 9x^3 + 13x^2 - 8x + 3} \\ \underline{-(2x^4 - 3x^3)} \\ -6x^3 + 13x^2 \\ \underline{-(-6x^3 + 9x^2)} \\ 4x^2 - 8x \\ \underline{-(4x^2 - 6x)} \\ -2x + 3 \\ \underline{-(-2x + 3)} \\ 0 \end{array}$$

~~$2x-3$ is a factor of $2x^4 - 9x^3 + 13x^2 - 8x + 3$~~

~~Division Algorithm~~

~~$$(2x-3)(x^3 - 3x^2 + 2x - 1) = 2x^4 - 9x^3 + 13x^2 - 8x + 3$$~~

Find the quotient of the problem below. State if the divisor is a factor of the dividend. Then state the division algorithm as it relates to the problem. Write any remainders in fraction form

$$(3x^3 + 22x^2 - 48x - 5) \div (3x - 5)$$

$$\begin{array}{r} \boxed{x^2 + 9x - 1} \\ 3x-5 \overline{) 3x^3 + 22x^2 - 48x - 5} \\ \underline{-(3x^3 - 5x^2)} \\ 27x^2 - 48x \\ \underline{-(27x^2 - 45x)} \\ -3x - 5 \\ \underline{-(-3x + 5)} \\ -10 \end{array}$$

$$\boxed{x^2 + 9x - 1 - \frac{10}{3x-5}}$$

~~$3x-5$ is not a factor of $3x^3 + 22x^2 - 48x - 5$~~

~~Division Algorithm~~

~~$$(3x-5)(x^2 + 9x - 1) - 10 = 3x^3 + 22x^2 - 48x - 5$$~~

Find the quotient of the problem below. State if the divisor is a factor of the dividend. Then state the division algorithm as it relates to the problem. Write any remainders in fraction form

$$\frac{4x^4 + 35x^3 - 54x - 26}{4x + 3}$$

missing x^2 term

$$\begin{array}{r} \boxed{x^3 + 8x^2 - 6x - 9} \\ 4x+3 \overline{) 4x^4 + 35x^3 + 0x^2 - 54x - 26} \\ \underline{-(4x^4 + 3x^3)} \\ 32x^3 + 0x^2 \\ \underline{-(32x^3 + 24x^2)} \\ -24x^2 - 54x \\ \underline{-(-24x^2 - 18x)} \\ -36x - 26 \\ \underline{-(-36x - 27)} \\ 1 \end{array}$$

$$\boxed{x^3 + 8x^2 - 6x - 9 + \frac{1}{4x+3}}$$

~~$4x+3$ is not a factor of $4x^4 + 35x^3 - 54x - 26$~~

~~Division Algorithm~~

~~$$(4x+3)(x^3 + 8x^2 - 6x - 9) + 1 = 4x^4 + 35x^3 - 54x - 26$$~~

Find the quotient of the problem below. Then continue to factor the quotient and state in the form of the division algorithm

$$\frac{x^3 - 4x^2 - 11x + 30}{x - 2}$$

$$\begin{array}{r} x^2 - 2x - 15 \\ x-2 \overline{) x^3 - 4x^2 - 11x + 30} \\ \underline{-(x^3 - 2x^2)} \\ -2x^2 - 11x \\ \underline{-(-2x^2 + 4x)} \\ -15x + 30 \\ \underline{-(-15x + 30)} \\ 0 \end{array}$$

$x-2$ is a factor of $x^3 - 4x^2 - 11x + 30$

division algorithm

$$(x-2)(x^2 - 2x - 15) = x^3 - 4x^2 - 11x + 30$$

factor again

$$(x-2)(x-5)(x+3) = x^3 - 4x^2 - 11x + 30$$

Find the quotient of the problem below. Then continue to factor the quotient and state in the form of the division algorithm

$$\frac{x^3 - 3x^2 - 4x + 12}{x - 3}$$

$$\begin{array}{r} x^2 + 0x - 4 \\ x-3 \overline{) x^3 - 3x^2 - 4x + 12} \\ \underline{-(x^3 - 3x^2)} \\ 0 - 4x \\ \underline{-(0 - 0)} \\ -4x + 12 \\ \underline{-(-4x + 12)} \\ 0 \end{array}$$

$x-3$ is a factor of $x^3 - 3x^2 - 4x + 12$

division algorithm

$$(x-3)(x^2 - 4) = x^3 - 3x^2 - 4x + 12$$

factor again.
Use diff of squares...

$$(x-3)(x-2)(x+2) = x^3 - 3x^2 - 4x + 12$$

Find the missing information in the problem below

$$\begin{array}{r} x^2 + 6x + 18 \text{ R } 84 \\ x-4 \overline{) x^3 + 2x^2 - 6x + 12} \\ \underline{-(x^3 - 4x^2)} \\ 6x^2 - 6x + 12 \\ \underline{-(6x^2 - 24x)} \\ 18x + 12 \\ \underline{-(18x - 72)} \\ 84 \end{array}$$

Find the missing information in the problem below

$$\begin{array}{r} x^2 - x - 3 \\ x+3 \overline{) x^3 + 2x^2 - 6x + 12} \\ \underline{-(x^3 + 3x^2)} \\ -x^2 - 6x + 12 \\ \underline{-(-x^2 - 3x)} \\ -3x + 12 \\ \underline{-(-3x - 9)} \\ 21 \end{array}$$

$$\begin{array}{r} x^2 - 11x + 54 + \frac{-180}{x-3} \\ x-3 \overline{) x^3 - 8x^2 + 21x - 18} \\ \underline{-(x^3 - 3x^2)} \\ -11x^2 + 21x - 18 \\ \underline{-(-11x^2 + 33x)} \\ 54x - 18 \\ \underline{-(54x - 162)} \\ -180 \end{array}$$

Correct any mistakes in the problem above

$$\begin{array}{r} x^3 + 4x^2 + 7x + \frac{17}{x-2} \\ x-2 \overline{) x^4 + 2x^3 - x^2 + 3} \\ \underline{-(x^4 - 2x^3)} \\ 4x^3 - x^2 + 3 \\ \underline{-(4x^3 - 8x^2)} \\ 7x^2 + 3 \\ \underline{-(7x^2 - 14)} \\ 17 \end{array}$$

skipped variable

Correct any mistakes in the problem above