

OBJECTIVE 2: LONG Dividing to Divide by a Polynomial

TASK 1: Divide using long division the problem above. Remainder from 5th grade. The process is similar to long division with polynomials.

DIVISOR $13 \sqrt{3660}$ → REMAINDER $28 \text{ R. } 7$ → DIVIDEND $28 \text{ R. } 7 \text{ or } 281 + \frac{7}{13}$

$$\begin{array}{r} 106 \downarrow \\ -104 \downarrow \\ \hline 20 \\ -13 \\ \hline 7 \end{array}$$

TASK 2: Divide using long division, and write your answer in simplest form.

- a) $x^2 + 7x + 12$ by $x + 3$
 b) $x^2 + 5x + 6$ by $x + 2$

$$\begin{array}{r} x+4 \\ x+3 \overline{) x^2+7x+12} \\ \underline{-(x^2+3x)} \\ 4x+12 \\ \underline{-(4x+12)} \\ 0 \end{array}$$

$x+4$

$$\begin{array}{r} x+3 \\ x+2 \overline{) x^2+5x+6} \\ \underline{-(x^2+2x)} \\ 3x+6 \\ \underline{-(3x+6)} \\ 0 \end{array}$$

$x+3$

TASK 4: Divide using long division. Leave answer in simplest form.

- a) $6x^2 + 10x - 5$ by $3x - 1$
 b) $4x^2 + 8x - 7$ by $2x + 1$

$$\begin{array}{r} 2x+4 \\ 3x-1 \overline{) 6x^2+10x-5} \\ \underline{-(6x^2-2x)} \\ 12x-5 \\ \underline{-(12x-4)} \\ -1 \end{array}$$

$2x+4 \text{ R. } -1$
or
 $2x+4 - \frac{1}{3x-1}$

$$\begin{array}{r} 2x+3 \\ 2x+1 \overline{) 4x^2+8x-7} \\ \underline{-(4x^2+2x)} \\ 6x-7 \\ \underline{-(6x+3)} \\ -10 \end{array}$$

$2x+3 \text{ R. } -10$
or
 $2x+3 - \frac{10}{2x+1}$

TASK 5: Divide using long division. Leave answer in simplest form.

a) $\frac{4x^2 + 7 + 8x^3}{2x + 3}$

b) $\frac{11x^3 - 3 + 9x^3}{3x + 2}$

$$\begin{array}{r} 4x^2 - 4x + 6 \\ 2x + 3 \overline{) 8x^3 + 4x^2 + 0x + 7} \\ \underline{-(8x^3 + 12x^2)} \\ -8x^2 + 0x \\ \underline{-(-8x^2 - 12x)} \\ 12x + 7 \\ \underline{-(12x + 18)} \\ -11 \end{array}$$

$$\begin{array}{r} 3x^2 - 2x + 5 \\ 3x + 2 \overline{) 9x^3 + 0x^2 + 11x - 3} \\ \underline{-(9x^3 + 6x^2)} \\ -6x^2 + 11x \\ \underline{-(-6x^2 - 4x)} \\ 15x - 3 \\ \underline{-(15x + 10)} \\ -13 \end{array}$$

$3x^2 - 2x + 5 - \frac{13}{3x+2}$

TASK 6: Divide using long division. Leave answer in simplest form.

a) $(x^3 - 8) \div (x - 2)$

b) $(x^3 + 27) \div (x + 3)$

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

$x^2 + 2x + 4$

$$\begin{array}{r} x^2 - 3x + 9 \\ x + 3 \overline{) x^3 + 0x^2 + 0x + 27} \\ \underline{-(x^3 + 3x^2)} \\ -3x^2 + 0x \\ \underline{-(-3x^2 - 9x)} \\ 9x + 27 \\ \underline{-(9x + 27)} \\ 0 \end{array}$$

$x^2 - 3x + 9$

TASK 3 & 7: Steps for solving division of polynomials using long division

1. Rewrite with divisor on left & dividend under in standard form.
2. Fill in missing terms with zero.
3. Leading term of divisor into 1st term of dividend.
4. Multiply top with divisor, write under dividend!
5. Subtract and drop down next term & repeat!
6. Always have same numbers of terms in divisor & new dividend.
7. When no more terms are left to \downarrow , then that is your remainder. R. or R

Still need help with: