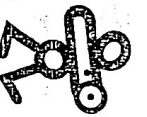


Synthetic Division

- A simpler process for dividing a polynomial by a linear factor!
 You will like this ☺
1. Write coefficients in descending order (use a zero for a missing term)
 2. Write the ROOT from the given factor (use a zero for a missing term)
 3. Bring down the first coefficient
 4. Multiply, add, multiply, add...until finished
 5. Write the answer, starting the polynomial as ONE degree lower than original



Simplify.

1. $\frac{10x+6}{2}$

$\frac{5x+3}{2}$
 $2 \overline{) 10x+6}$
 $\underline{-10x}$
 0

2. $\frac{15y^2+6y^2+3y}{3y}$

$3y \overline{) 15y^2+6y^2+3y}$
 $\underline{-15y^2}$
 $6y^2$
 $\underline{-6y^2}$
 $3y$

3. $\frac{x^2+7x+10}{x+5}$

$x+5 \overline{) x^2+7x+10}$
 $\underline{-x^2-5x}$
 $2x+10$
 $\underline{-2x-10}$
 0

4. $\frac{2x^2+13x+15}{x+5}$

$2x+3$

$(4) \underline{5} \overline{) 2 \ 13 \ 15}$
 $\underline{-10}$
 3
 $\underline{-15}$
 0

5. $\frac{2x^2-5x-4}{x-3}$

$x-3 \overline{) 2x^2-5x-4}$
 $\underline{-2x^2+6x}$
 $-11x-4$
 $\underline{-11x+33}$
 37

6. $\frac{x^2+5x-12}{x-2}$

$x+8$

$(6) \underline{3} \overline{) 1 \ 5 \ -12}$
 $\underline{-3}$
 2
 $\underline{-6}$
 24
 $\underline{-24}$
 0

7. $\frac{y^3-y^2-6}{y+2}$

$y^2-3y+6 \overline{) y^3-y^2-6}$
 $\underline{-y^3+2y^2}$
 $3y^2-6$
 $\underline{-3y^2+6y}$
 $6y-6$
 $\underline{-6y+12}$
 6

8. $\frac{3x^4+4x^3-32x^2-5x-20}{x+4}$

$(8) \underline{4} \overline{) 3 \ 4 \ -32 \ -5 \ -20}$
 $\underline{-12}$
 32
 $\underline{-32}$
 0
 $\underline{-20}$
 20

9. $\frac{2x^3-x^2-19x+15}{x-3}$

$x-3 \overline{) 2x^3-x^2-19x+15}$
 $\underline{-2x^3+6x^2}$
 $-7x^2-19x+15$
 $\underline{7x^2-21x}$
 $4x+15$
 $\underline{-4x+12}$
 27

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

$(4) \underline{3} \overline{) 4 \ -3 \ 2 \ 0}$
 $\underline{-4}$
 7
 $\underline{-7}$
 9
 $\underline{-9}$
 0

11. $\frac{6x^2+x-2}{2x-1}$

$3x+2 \overline{) 6x^2+x-2}$
 $\underline{-6x^2+3x}$
 $-4x-2$
 $\underline{4x-2}$
 0

12. $\frac{4x^2-9}{2x+3}$

$(4) \underline{1} \overline{) 4 \ 0 \ -9}$
 $\underline{-4x-12}$
 12
 $\underline{-12}$
 3
 $\underline{-3}$
 0

(3) $x+5 \overline{) x^2+7x+10}$

$x+5 \overline{) x^2+7x+10}$
 $\underline{-(x^2+5x)}$
 $2x+10$
 $\underline{-(2x+10)}$
 0

(11) $2x+3 \overline{) 4x^2+0x-9}$

$2x+3 \overline{) 4x^2+0x-9}$
 $\underline{-(4x^2+6x)}$
 $-6x-9$
 $\underline{6x+9}$
 0

ex1) $(2x^3 - 7x^2 - 8x + 16) \div (x - 4)$

$\underline{4} \overline{) 2 \ -7 \ -8 \ 16}$
 $\underline{8 \ 4 \ -16}$
 $2x^2 + 1x - 4$

ex2) $(3x^3 - x^2 + 2x - 4) \div (x - 3)$

$\underline{3} \overline{) 3 \ -1 \ 2 \ -4}$
 $\underline{9 \ 24 \ 78}$
 $3x^2 + 8x + 26 \frac{74}{x-3}$

ex3) $(z^4 - 20) \div (z + 2)$

$\underline{-2} \overline{) 1 \ 0 \ 0 \ 0 \ -20}$
 $\underline{-2 \ 4 \ -8 \ 16}$
 $z^3 - 2z^2 + 4z - 8 \frac{-4}{z+2}$

(11) $2x-1 \overline{) 6x^2+x-2}$

$2x-1 \overline{) 6x^2+x-2}$
 $\underline{-(6x^2-3x)}$
 $4x-2$
 $\underline{-4x+2}$
 0

(7) $y+2 \overline{) y^2-3y+6}$

$y+2 \overline{) y^2-3y+6}$
 $\underline{-(y^2+2y)}$
 $-5y+6$
 $\underline{5y+10}$
 -4

$3y^2+0y$
 $\underline{-(3y^2-6y)}$
 $6y-6$
 $\underline{6y-12}$
 6