Polynomials

~~$2x^3 + 12x + 6$ is to divide by $2x$~~

$$= \frac{2x^3}{2x} + \frac{12x}{2x} +$$

Polynomials.

1. $x+1 \;\big|\; x^2 - x + 1 \;\big|\; x-2$

$x^2 \pm x$ (−) (±)

$-2x + 1$

$-2x - 2$

(+) (+)

1

quotient = $x-2$

remainder = 1

2. $2x-1 \;\big|\; 6x^2 - 5x + 1 \;\big|\; 3x-1$

$6x^2 - 3x$

$-2x + 1$

$-2x + 1$

x

quotient = $3x-1$

remainder = 0.

3. $y+1 \;\big|\; 2y^3 + 4y^2 + 3y + 1 \;\big|\; 2y^2 + 2y + 1$

(−) $2y^3 + 2y^2$ (−)

$2y^2 + 3y + 1$

(−) $2y^2 + 2y$ (−)

$y + 1$

$y + 1$

(−) (−)

x

quotient = $2y^2 + 2y + 1$

remainder = 0

4. ~~$4x + x^2 + 2$~~ $\;\big|\; x^2 + 4x + 2 \;\big|\; x^5 + 5x^3 + 3x^2 + 5x + 3 \;\big|\; x^3 - 4x^2 + 19x$

$x^5 + 2x^3 + 4x^4$

$3x^3 - 4x^4 + 3x^2 + 5x + 3$

(+) $-18x^3$ (−) $-4x^4$ (+) $-8x^2$

$19x^3 + 11x^2 + 5x + 3$

$19x^3$ $+ 76x^2 + 38x$

(−)

4. $x^2+4x+2 \;\big|\; x^5+5x^3+3x^2+5x+3 \;\big|\; x^3-4x^2+19x-65$

$x^5+2x^3+4x^4$

$-4x^4+3x^3+3x^2+5x+3$

$-4x^4-16x^3-8x^2$ (+) (+) (+)

$19x^3+11x^2+5x+3$

$19x^3+76x^2+38x$ (−) (−)

$-65x^2-33x+3$

$-65x^2-260x-130$ (+) (+)

$227x+133$

quotient = $x^3-4x^2+19x-65$

remainder = $227x+133$

5. $x-y \;\big|\; x^2-2xy+y^2 \;\big|\; x-y$

x^2-xy (−) (+)

$-xy+y^2$

$-xy+y^2$

0

quotient = $x-y$

remainder = 0

6. ~~$a-b \;\big|\; a$~~ ~~a~~

$a-b \;\big|\; a \;\big|\; 1$

$a-b$ (−) (+)

b

quotient = 1

remainder = b

7. (quotient × divisor) + remainder

$= [(x+1) \times (3x^2-2x+2)] + 3$

$= 3x^3-2x^2+2x+3x^2-2x+2+3$

$= 3x^3+x^2+5$ is dividend

8. $[(x+1)(4x-7)] + 0$

$= 4x^2-7x+4x-7$

$= 4x^2-3x-7$ is dividend

10. $x-3 \;\big|\; x^2-5x+3 \;\big|\; x-2$

$-2x+3$

$-2x+6$ (+) (−)

-3

∴ remainder is not zero

9. $x-1 \;\big|\; 4x^3+3x^2+2x-9 \;\big|\; 4x^2+7x+11$

$4x^3-4x^2$

$7x^2+2x-9$

$7x^2-7x$

$11x-9$

$11x-11$ (+) (+)

2

∴ remainder is not zero