


$$1) \quad a) \quad f \rightarrow (x^4 + 3x^3 + 2x^2 + 6x - 5) : (x - 2) = \underbrace{x^3 + 5x^2 + 12x + 30}_{\text{Q}} \quad \uparrow g$$

$$\begin{array}{r} x^4 - 2x^3 \\ \hline 5x^3 + 2x^2 + 6x - 5 \end{array}$$

$$\begin{array}{r} 5x^3 - 10x^2 \\ \hline \end{array}$$

$$\begin{array}{r} 12x^2 + 6x - 5 \\ \hline \end{array}$$

$$\begin{array}{r} 12x^2 - 24x \\ \hline \end{array}$$

$$\begin{array}{r} 30x - 5 \\ \hline \end{array}$$

$$\begin{array}{r} 30x - 60 \\ \hline \end{array}$$

$$\begin{array}{r} 755 \\ \hline \end{array}$$

← R

→ WAS 3 IN THE SAMPLE, CORRECTED HERE

1/b

$$(x^4 + 2x^3 + 3x^2 + 4x + 1) : (x+2) = \boxed{x^2 + 3x + 3}$$

$$\underline{x^4 + 2x^3}$$

$$3x^2 + 4x + 1$$

$$\underline{3x^2 + x}$$

$$3x + 1$$

$$\underline{3x + 1}$$

$$0$$

WOULD
BE

6, BUT

$$6 \equiv 1 \pmod{5}$$

1/c

$$(x^7 + x^5 + x^2 + 1) : (x^2 + x + 1) = x^5 + x^4 + x^3 + x$$

$$x^7 + x^6 + x^5$$

Mod 2!

$$\rightarrow \boxed{x^6} + x^2 + 1$$

$$x^6 + x^5 + x^5$$

$$x^5 + x^4 + x^2 + 1$$

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

$$x^3 + x^2 + 1$$

$$x^3 + x^2 + x$$

$$x + 1$$

2/c

$$(x^4 + 3x^3 + Px^2 - x + Q) : (x-2) = x^3 + 5x^2 + (P+10)x + (2P+19)$$

$$\underline{x^4 - 2x^3}$$

$$5x^3 + 7x^2 - x + Q$$

$$\underline{5x^3 - 10x^2}$$

$$(P+10)x^2 - x + Q$$

$$\underline{(P+10)x^2 - 2(P+10)x}$$

$$(2P+19)x + Q$$

$$\underline{(2P+19)x - 2(2P+19)}$$

$$4P + Q + 38$$

CONDITION : $\boxed{4P + Q + 38 = 7}$

2/b SIMILAR TO 2/a :

REMAINDER :

$$3P - 2Q + 45 = 0$$

2/c: SOLVE SYSTEM OF EQUATIONS 2/a + 2/b)

$$P = -107/11$$

$$Q = 87/11$$

RMK: PROBL. 4 CAN BE DONE ON PAPER

$$(x^4 + Px + Q) : (x^2 + Mx + 1) = x^2 - Mx + M^2 - 1$$

$$\vdots$$
$$[-(M^2 - 1)M + M + P] \cdot x - M^2 + Q + 1$$

$\underbrace{\hspace{10em}}$

$$= 0$$



$$Q = m^2 - 1$$

$$P = m^3 - 2m$$

m : anything