



3a Avaluació – MATEMÀTIQUES

Data: divendres 20 de març de 2020

ALUMNE/A:

Us adjuntem la correcció dels exercicis de dimecres 18 de març. Us recomanem revisar els errors i repetir els apartats que no tingueu completament bé. Recordeu que ens podeu enviar els vostres dubtes als nostres correus:

fcps.laia.rafols@stjosep.com

fcps.imma.navarret@stjosep.com

fcps.nerea.pinedo@stjosep.com

La setmana que ve publicarem també les solucions dels exercicis del llibre “posa a prova les teves competències”.

Ja hem superat la primera setmana, molts ànims a tots!

$$h) \frac{x+3}{x^2-9} = \frac{\cancel{(x+3)}}{\cancel{(x+3)}(x-3)} = \boxed{\frac{1}{x-3}}$$

$$i) \frac{a^2-ab}{a^4-a^2b^2} = \frac{a \cdot \cancel{(a-b)}}{a^2 \cdot \cancel{(a-b)}(a+b)} = \frac{\cancel{a} \cdot \cancel{(a-b)}}{a^{\cancel{2}}(a+b)\cancel{(a-b)}} = \boxed{\frac{1}{a(a+b)}}$$

$$j) \frac{12x^2-12xy}{12xy-12y^2} = \frac{\cancel{12x} \cdot \cancel{(x-y)}}{\cancel{12y} \cdot \cancel{(x-y)}} = \boxed{\frac{x}{y}}$$

$$k) \frac{x^2-2xy+y^2}{x^2-y^2} = \frac{(x-y)^{\cancel{2}}}{(x+y)\cancel{(x-y)}} = \boxed{\frac{x-y}{x+y}}$$

$$l) \frac{\cancel{(x-4)}(x+2)^{\cancel{2}}}{\cancel{(x+2)}\cancel{(x-4)}(x-5)} = \boxed{\frac{x+2}{x-5}}$$

$$m) \frac{\cancel{x} \cdot \cancel{(x+2)}^2 \cancel{(x-3)}^2 \cdot \cancel{(x-1)}}{x^{\cancel{2}} \cdot \cancel{(x+2)}^3 \cancel{(x-3)} \cdot \cancel{(x-1)}} = \frac{\cancel{(x+2)} \cancel{(x+2)} \cancel{(x-3)}}{x \cdot \cancel{(x+2)} \cancel{(x+2)} \cancel{(x+2)}} =$$

$$= \boxed{\frac{x-3}{x \cdot (x+2)}}$$

$$n) \frac{(x-1)^3 \cdot \cancel{(x-5)}^4}{\cancel{(x-5)}^3 \cdot \cancel{(x-1)}^2 \cdot (x+2)} = \frac{\cancel{(x-1)} \cancel{(x-1)} \cancel{(x-1)} \cdot \cancel{(x-5)}^{\cancel{4}}}{\cancel{(x-5)}^{\cancel{3}} \cancel{(x-1)} \cancel{(x-1)} (x+2)} =$$

$$= \boxed{\frac{(x-1)(x-5)}{(x+2)}}$$

$$e) \frac{x^2 - 6x + 8}{x^2 - 3x + 2} = \frac{P(x)}{Q(x)}$$

$$P(x) = x^2 - 6x + 8 \longrightarrow \text{Provarem } \{ \pm 1, \pm 2, \pm 4, \pm 8 \}$$

$$P(1) = 1 - 6 + 8 \neq 0$$

$$P(-1) = 1 + 6 + 8 \neq 0$$

$$P(2) = 4 - 12 + 8 = 0 \Rightarrow 2 \text{ és arrel de } P(x)$$

$$\begin{array}{r|rrr} & 1 & -6 & 8 \\ 2 & & 2 & -8 \\ \hline & 1 & -4 & 0 \end{array}$$

$$P(x) = (x-2) \cdot (x-4)$$

$$Q(x) = x^2 - 3x + 2 \longrightarrow \text{Provarem } \{ \pm 1, \pm 2 \}$$

$$Q(1) = 1 - 3 + 2 = 0 \Rightarrow 1 \text{ és arrel de } Q(x)$$

$$\begin{array}{r|rrr} & 1 & -3 & 2 \\ 1 & & 1 & -2 \\ \hline & 1 & -2 & 0 \end{array}$$

$$Q(x) = (x-1)(x-2)$$

$$\frac{P(x)}{Q(x)} = \frac{\cancel{(x-2)} \cdot (x-4)}{(x-1) \cdot \cancel{(x-2)}} = \boxed{\frac{x-4}{x-1}}$$

$$p) \frac{x^2 - 4x + 4}{x^2 - 5x + 6} = \frac{(x-2)^2}{\underbrace{x^2 - 5x + 6}_{P(x)}}$$

$$P(1) = 1 - 5 + 6 \neq 0$$

$$P(-1) \neq 0$$

$$P(2) = 4 - 10 + 6 = 0 \Rightarrow 2 \text{ és arrel de } P(x)$$

	1	-5	6
2		2	-6
	1	-3	<u>0</u>

$$P(x) = (x-2) \cdot (x-3)$$

$$\frac{\cancel{(x-2)} \cdot (x-2)}{\cancel{(x-2)} \cdot (x-3)} = \boxed{\frac{x-2}{x-3}}$$

$$q) \frac{2x^2 - 8x + 6}{x^2 - 2x - 3} = \frac{2 \cdot \overbrace{(x^2 - 4x + 3)}^{P(x)}}{\underbrace{x^2 - 2x - 3}_{Q(x)}}$$

$$P(1) = 1 - 4 + 3 = 0 \Rightarrow 1 \text{ és arrel de } P(x)$$

	1	-4	3
1		1	-3
	1	-3	<u>0</u>

$$P(x) = (x-1) \cdot (x-3)$$

$$Q(1) = 1 - 2 - 3 \neq 0$$

$$Q(-1) = 1 + 2 - 3 = 0 \Rightarrow -1 \text{ és arrel de } Q(x)$$

	1	-2	-3
-1		-1	3
	1	-3	<u>0</u>

$$Q(x) = (x+1)(x-3)$$

$$\frac{2 \cdot P(x)}{Q(x)} = \frac{2 \cdot (x-1) \cdot \cancel{(x-3)}}{(x+1) \cdot \cancel{(x-3)}} = \boxed{\frac{2 \cdot (x-1)}{x+1}}$$

$$r) \frac{x^2 + 6x + 9}{x^2 + 5x + 6} = \frac{(x+3)^2}{P(x)}$$

$$P(x) = x^2 + 5x + 6$$

$$P(1) = 1 + 5 + 6 \neq 0$$

$$P(-1) = 1 - 5 + 6 \neq 0$$

$$P(2) = 4 + 10 + 6 \neq 0$$

$$P(-2) = 4 - 10 + 6 = 0 \Rightarrow -2 \text{ es arrel de } P(x)$$

$$\begin{array}{r|rrr} & 1 & 5 & 6 \\ -2 & & -2 & -6 \\ \hline & 1 & 3 & 0 \end{array}$$

$$P(x) = (x+2) \cdot (x+3)$$

$$\frac{(x+3)^2}{P(x)} = \frac{(x+3) \cdot (x+3)}{(x+2) \cdot (x+3)} = \boxed{\frac{x+3}{x+2}}$$

$$s) \frac{x^2 + 5x + 4}{2x^2 - 4x - 6} = \frac{P(x)}{2 \cdot (x^2 - 2x - 3)} = \frac{P(x)}{2 \cdot Q(x)}$$

$$P(x) = x^2 + 5x + 4$$

$$P(1) = 1 + 5 + 4 \neq 0$$

$$P(-1) = 1 - 5 + 4 = 0 \Rightarrow -1 \text{ es arrel de } P(x)$$

$$\begin{array}{r|rrr} & 1 & 5 & 4 \\ -1 & & -1 & -4 \\ \hline & 1 & 4 & 0 \end{array}$$

$$P(x) = (x+1) \cdot (x+4)$$

$$Q(x) = x^2 - 2x - 3$$

$$Q(1) = 1 - 2 - 3 \neq 0$$

$$Q(-1) = 1 + 2 - 3 = 0 \Rightarrow -1 \text{ es arrel de } Q(x)$$

$$\begin{array}{r|rrr} & 1 & -2 & -3 \\ -1 & & -1 & 3 \\ \hline & 1 & -3 & 0 \end{array}$$

$$Q(x) = (x+1) \cdot (x-3)$$

$$\frac{P(x)}{2 \cdot Q(x)} = \frac{(x+1) \cdot (x+4)}{2 \cdot (x+1) \cdot (x-3)} = \boxed{\frac{x+4}{2(x-3)}}$$

$$t) \frac{x^2 - 5x + 6}{x^2 - 7x + 10} = \frac{P(x)}{Q(x)}$$

$$P(1) = 1 - 5 + 6 \neq 0$$

$$P(-1) = 1 + 5 + 6 \neq 0$$

$$P(2) = 4 - 10 + 6 = 0 \Rightarrow 2 \text{ es arrel de } P(x)$$

$$P(x) = (x-2) \cdot (x-3)$$

$$Q(x) = x^2 - 7x + 10$$

$$Q(1) = 1 - 7 + 10 \neq 0$$

$$Q(-1) = 1 + 7 + 10 \neq 0$$

$$Q(2) = 4 - 14 + 10 = 0 \Rightarrow 2 \text{ es arrel de } Q(x)$$

$$Q(x) = (x-2) \cdot (x-5)$$

$$\begin{array}{r|rrr} & 1 & -5 & 6 \\ 2 & & 2 & -6 \\ \hline & 1 & -3 & 0 \end{array}$$

$$\begin{array}{r|rrr} & 1 & -7 & 10 \\ 2 & & 2 & -10 \\ \hline & 1 & -5 & 0 \end{array}$$

$$\frac{P(x)}{Q(x)} = \frac{\cancel{(x-2)} \cdot (x-3)}{\cancel{(x-2)} \cdot (x-5)} = \boxed{\frac{x-3}{x-5}}$$

$$u) \frac{x^4 - x^3 - 34x^2 + 4x + 120}{x^4 - 4x^2} = \frac{P(x)}{x^2 \cdot (x^2 - 4)} =$$

$$= \frac{P(x)}{x^2 \cdot (x+2) \cdot (x-2)}$$

$$P(1) = 1 - 1 - 34 + 4 + 120 \neq 0$$

$$P(-1) = 1 + 1 - 34 - 4 + 120 \neq 0$$

$$P(2) \neq 0$$

$$P(-2) = 0 \Rightarrow -2 \text{ és arrel de } P(x)$$

$$\begin{array}{r|rrrrr} & 1 & -1 & -34 & 4 & 120 \\ -2 & & -2 & 6 & 56 & -120 \\ \hline & 1 & -3 & -28 & 60 & 0 \end{array}$$

$$P(x) = (x+2) \cdot \underbrace{(x^3 - 3x^2 - 28x + 60)}_{Q(x)}$$

$$Q(-2) \neq 0$$

$$Q(3) = -24 \neq 0$$

$$Q(-3) = 90 \neq 0$$

$$Q(4) = -36 \neq 0$$

$$Q(-4) = 60 \neq 0$$

$$Q(5) = -30 \neq 0$$

$$Q(-5) = 0 \Rightarrow -5 \text{ és arrel de } Q(x)$$

$$\begin{array}{r|rrrr} & 1 & -3 & -28 & 60 \\ -5 & & -5 & 40 & -60 \\ \hline & 1 & -8 & 12 & 0 \end{array}$$

$$Q(x) = (x+5) \cdot (x^2 - 8x + 12)$$

$$P(x) = (x+2) \cdot (x+5) \cdot \underbrace{(x^2 - 8x + 12)}_{R(x)}$$

$$R(6) = 0 \Rightarrow 6 \text{ és arrel de } R(x)$$

$$\begin{array}{r|rrr} & 1 & -8 & 12 \\ 6 & & 6 & -12 \\ \hline & 1 & -2 & 0 \end{array}$$

$$R(x) = (x-6) \cdot (x-2)$$

$$P(x) = (x+2) \cdot (x+5) \cdot (x-6) \cdot (x-2)$$

$$\frac{P(x)}{x^2 \cdot (x+2) \cdot (x-2)} = \frac{\cancel{(x+2)} \cdot (x+5) \cdot (x-6) \cdot \cancel{(x-2)}}{x^2 \cdot \cancel{(x+2)} \cdot \cancel{(x-2)}} = \boxed{\frac{(x+5) \cdot (x-6)}{x^2}}$$

$$v) \frac{x^3 - 4x^2 + 3x}{2x^2 - 8x + 6} = \frac{x \cdot (x^2 - 4x + 3)}{2 \cdot (x^2 - 4x + 3)} = \boxed{\frac{x}{2}}$$

$$w) \frac{x^3 - 3x + 2}{x^3 - x^2 - x + 1} = \frac{P(x)}{Q(x)}$$

$$P(1) = 1 - 3 + 2 = 0 \Rightarrow 1 \text{ és arrel de } P(x)$$

	1	0	-3	2
1		1	1	-2
		1	-2	0

$$P(x) = (x-1) \cdot \underbrace{(x^2 + x - 2)}_{R(x)}$$

$$R(1) = 1 + 1 - 2 = 0 \Rightarrow 1 \text{ és arrel de } R(x)$$

	1	1	-2
1		1	2
		2	0

$$R(x) = (x-1) \cdot (x+2)$$

$$P(x) = (x-1) \cdot (x-1) \cdot (x+2)$$

$$Q(1) = 1 - 1 - 1 + 1 = 0 \Rightarrow 1 \text{ és arrel de } Q(x)$$

	1	-1	-1	1
1		1	0	-1
		0	-1	0

$$Q(x) = (x-1) \cdot (x^2-1) = (x-1) \cdot (x+1) \cdot (x-1)$$

$$\frac{P(x)}{Q(x)} = \frac{\cancel{(x-1)} \cdot \cancel{(x-1)} \cdot (x+2)}{\cancel{(x-1)} \cdot (x+1) \cdot \cancel{(x-1)}} = \boxed{\frac{x+2}{x+1}}$$

$$x) \frac{x^4 - 10x^3 + 35x^2 - 50x + 24}{x^3 - 6x^2 + 11x - 6} = \frac{P(x)}{Q(x)}$$

$$P(1) = 0 \Rightarrow 1 \text{ és arrel de } P(x)$$

1	1	-10	35	-50	24
1		1	-9	26	-24
	1	-9	26	-24	<u>0</u>

$$P(x) = (x-1) \cdot \underbrace{(x^3 - 9x^2 + 26x - 24)}_{R(x)}$$

$$R(1) = -6 \neq 0$$

$$R(-1) = -60 \neq 0$$

$$R(2) = 0 \Rightarrow 2 \text{ és arrel de } R(x)$$

	1	-9	26	-24
2		2	-14	24
	1	-7	12	<u>0</u>

$$P(x) = (x-1) \cdot (x-2) \cdot \underbrace{(x^2 - 7x + 12)}_{S(x)}$$

$$S(2) = 2 \neq 0$$

$$S(-2) \neq 0$$

$$S(3) = 0 \Rightarrow 3 \text{ és arrel de } S(x)$$

	1	-7	12
3		3	-12
	1	-4	<u>0</u>

$$P(x) = (x-1) \cdot (x-2) \cdot (x-3) \cdot (x-4)$$

$$Q(1) = 0 \Rightarrow 1 \text{ és arrel de } Q(x)$$

	1	-6	11	-6
1		1	-5	6
	1	-5	6	<u>0</u>

$$Q(x) = (x-1) \cdot \underbrace{(x^2 - 5x + 6)}_{T(x)}$$

$$T(1) = 2 \neq 0$$

$$T(-1) \neq 0$$

$$T(2) = 0 \Rightarrow 2 \text{ és arrel de } T(x)$$

	1	-5	6
2		2	-6
	1	-3	<u>0</u>

$$Q(x) = (x-1) \cdot (x-2) \cdot (x-3)$$

$$\frac{P(x)}{Q(x)} = \frac{\cancel{(x-1)} \cdot \cancel{(x-2)} \cdot \cancel{(x-3)} \cdot (x-4)}{\cancel{(x-1)} \cdot \cancel{(x-2)} \cdot \cancel{(x-3)}} = \boxed{x-4}$$