

1) Calcular valor numérico

$$\begin{aligned} \text{a)} \quad & 1 + \{3 \times [3 - (20 - 10) + 10] + 5\} - 3 = \\ & = 1 + \{3 \times [3 - \cancel{10} + \cancel{10}] + 5\} - 3 \\ & = 1 + \{3 \times 3 + 5\} - 3 \\ & = 1 + \{9 + 5\} - 3 = 1 + 14 - 3 = \underline{12} \end{aligned}$$

$$\begin{aligned} \text{b)} \quad & \frac{2}{3} - \frac{3}{5} \times \left(\frac{1}{3} + \frac{5}{8}\right) - \frac{2}{4} = \quad \textcircled{10} \quad \frac{1}{3} + \frac{5}{8} = \frac{8+15}{24} = \frac{23}{24} \\ & = \frac{2}{3} - \frac{3}{5} \times \frac{23}{24} - \frac{2}{4} = \frac{2}{3} - \frac{3 \times 23}{5 \times 24} - \frac{2}{4} = \frac{2}{3} - \frac{69}{120} - \frac{2}{4} = \end{aligned}$$

$$\begin{array}{r|l} 3,8 & 2 \\ 3,4 & 2 \times \\ 3,2 & 2 \\ 3,1 & 3 \\ \hline 11 & 24 \end{array}$$

$$= \frac{80 - 69 - 60}{120} = -\frac{49}{120}$$

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$$\begin{array}{r|l} 3,120,4 & 2 \\ 3,60,2 & 2 \\ 3,30,1 & 2 \times \\ 3,15,1 & 3 \\ 1,5,1 & 5 \\ \hline 1,1,1 & 120 \end{array}$$

$$\begin{aligned} \text{c)} \quad & \frac{\frac{4}{5} \times \left(\frac{7}{3} - 1\right)}{\frac{2}{9} - 3} = \frac{\frac{4}{5} \times \left(\frac{7-3}{3}\right)}{\frac{2-27}{9}} = \frac{\frac{4}{5} \times \frac{4}{3}}{-\frac{25}{9}} = \end{aligned}$$

$$= \frac{16/15}{-25/9} = \frac{16}{15} \times \left(-\frac{9}{25}\right) = -\frac{144}{375} = -\frac{48}{125}$$

$$\text{d)} \quad \frac{2}{3} + 2^3 - 1^{-4} = \frac{2}{3} + 8 - 1 = \frac{2+24-3}{3} = \frac{23}{3}$$

$$\begin{aligned} \text{e)} \quad & 2^4 + (-1)^4 - (-2)^2 + 0^8 + 27^0 + 6 \times 2 = \\ & = 16 + 1 - 4 + 0 + 1 + 12 = 26 \end{aligned}$$

$$\text{f)} \quad \left(\frac{1}{5} - \frac{1}{3} + 2\right)^{-2} + \frac{2}{1 + 2^2 - (5)^{-2}} = \left(\frac{3-5+30}{15}\right)^{-2} + \frac{2}{1+4-\frac{1}{25}} =$$

$$\textcircled{15} \quad \left(\frac{28}{15}\right)^{-2} + \frac{2}{\frac{25+100-1}{25}} = \frac{15^2}{28^2} + \frac{2}{\frac{124}{25}} = \frac{225}{784} + 2 \times \frac{25}{124} =$$

$$= \frac{225}{784} + \frac{50}{124} = \frac{6.975 + 9.800}{24.304} = \frac{16.775}{24.304}$$

$$\begin{array}{r|l} 784,124 & 2 \\ 392,62 & 2 \times \\ 196,31 & 2 \\ 98,31 & 2 \\ 49,31 & 31 \\ 49,1 & 49 \\ \hline & 24.304 \end{array}$$

2) Calcular valores numéricos

a) $a^3 + b^3 - 2a^2 + 4ab + 1$ para $\begin{cases} a=1 \\ b=-2 \end{cases}$
 $= (1)^3 + (-2)^3 - 2(1)^2 + 4(1)(-2) + 1$
 $= 1 - 8 - 2 - 8 + 1 = -16 //$

b) $\frac{xy - x^2}{\sqrt{y}}$ para $\begin{cases} x=1/2 \\ y=2 \end{cases}$
 $= \frac{(\frac{1}{2})(2) - (\frac{1}{2})^2}{\sqrt{2}} = \frac{\frac{2}{2} - \frac{1}{4}}{\sqrt{2}} = \frac{\frac{4-1}{4}}{\sqrt{2}} = \frac{3/4}{\sqrt{2}} = \frac{3}{4\sqrt{2}} //$

3) Simplificar as expressões

a) $2(a^2 + a + 1) + 3(a^2 + 2a - 2) - 2(a^2 + 3a - 3)$
 $= 2a^2 + 2a + 2 + 3a^2 + 6a - 6 - 2a^2 - 6a + 6$
 $= 3a^2 + 2a + 2 //$

b) $b(a+b-c) + a(b+c-a) + c(a-b+c)$
 $= ab + b^2 - bc + ab + ac - a^2 + ac - bc + c^2$
 $= -a^2 + b^2 + c^2 + 2ab - 2bc + 2ac //$

4) Desenvolver produtos notáveis

OBS: $(a \pm b)^2 = a^2 \pm 2ab + b^2$

a) $(x+2)^2 = x^2 + 2 \cdot x \cdot 2 + 2^2 = x^2 + 4x + 4 //$

b) $(2x-3y)^2 = (2x)^2 - 2(2x)(3y) + (3y)^2$
 $= 4x^2 - 12xy + 9y^2$

c) $(2x+1)(2x-1) = \cancel{2x^2 + 2x - 2x - 1}$
 $= (2x)^2 - (1)^2 = 4x^2 - 1 //$

OBS: $(a+b)(a-b) = a^2 - b^2$

d) $(3a^2+b)(3a^2-b) = (3a^2)^2 - (b)^2 = 9a^4 - b^2 //$

5) Simplificar expressões

$$\rightarrow (a-b)^2 = a^2 - 2ab + b^2$$

$$a) (m-1)^2 - (m+1)(m-1) = (m^2 - 2m + 1) - (m^2 - 1)$$

$$\hookrightarrow (a+b)(a-b) = a^2 - b^2$$

$$= \cancel{m}^2 - 2m + 1 - \cancel{m}^2 + 1 = -2m + 2 \text{ [ou } 2(-m+1)]$$

$$b) \frac{3x^4 - 10x^2}{x^5 - x^2} = \frac{\cancel{x}^2(3x^2 - 10)}{\cancel{x}^2(x^3 - 1)} = \frac{3x^2 - 10}{x^3 - 1} \parallel$$

$$\rightarrow a^2 - b^2 = (a+b)(a-b)$$

$$c) \frac{x^2 - 16}{x + 4} = \frac{(\cancel{x}+4)(x-4)}{(\cancel{x}+4)} = \underline{x-4} \parallel$$

$$d) \frac{(x+3)^2}{x^2 - 9} = \frac{(\cancel{x}+3)(x+3)}{(\cancel{x}+3)(x-3)} = \frac{x+3}{x-3} \parallel$$

$$e) \frac{xy^2 - x^2y}{2xy} = \frac{\cancel{xy}(y-x)}{2\cancel{xy}} = \frac{y-x}{2} \parallel$$

$$\rightarrow (a+b)^2 = a^2 + 2ab + b^2$$

$$f) \frac{x^2 + 10x + 25}{x+5} = \frac{(x+5)^2}{x+5} = \frac{(\cancel{x}+5)(x+5)}{(\cancel{x}+5)} = \underline{x+5} \parallel$$

$$g) \frac{x^2 + 6x + 9}{2x+6} = \frac{(x+3)^2}{2(x+3)} = \frac{(x+3)(\cancel{x}+3)}{2(\cancel{x}+3)} = \frac{x+3}{2} \parallel$$