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Apellidos:

Nombre:

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1. Realizar las siguientes operaciones combinadas con fracciones (3 puntos):

a) 
$$\frac{\frac{1}{4} + \frac{2}{6}}{\frac{2}{9}} - \frac{\frac{9}{10} - \frac{4}{5}}{1 - \frac{2}{5}} =$$

b) 
$$\frac{\frac{1}{4} - \frac{2}{5}}{\frac{2}{5} - \frac{1}{2}} + \frac{\frac{2}{5}}{\frac{1}{3}} - 1 =$$

2. Calcula (2 puntos):

a)  $5^0 - 2^4 - (-5)^2 - 3^3 + (-6)^2 + 11^0 - 6^1 =$

b)  $3^1 - (-3)^3 - (-4)^2 + (-2)^5 + 9^2 + (-7)^0 =$

3. Efectúa las siguientes operaciones simplificando previamente las fracciones (2 puntos):

a) 
$$\left[ \left( \frac{3}{2} \div \frac{9}{4} \right)^3 \div \left( \frac{3}{4} \cdot \frac{2}{3} \cdot \frac{8}{3} \right)^2 \right] \cdot \left[ ((-4)^2 \cdot 3 - (-3)^2 \cdot 5) \cdot \left( \frac{1}{5} \div \frac{3}{10} \right)^2 \right] =$$

b)  $\left(\frac{5}{4} - \frac{7}{10} - \frac{1}{20}\right)^3 \cdot \left(\frac{2}{3} \div \frac{1}{6}\right)^2 =$

4. Expresa en forma de una sola potencia las siguientes expresiones (1 punto):

a)  $(-4)^4 \cdot 4^{-6} \cdot (-4)^8 \cdot 4^{-3} =$

b)  $\left(-\frac{3}{7}\right)^6 \div \left(\frac{3}{7}\right)^{-5} =$

5. Calcula (2 puntos):

a)  $\frac{3^3 \cdot 3^{-1}}{3^2} + \frac{5^2 \cdot 5^{-3} \cdot 5^9}{5^4 \cdot 5 \cdot 5^2} + 4^2 \cdot 4^{-3} \cdot 4^3 + 2^0 =$

b)  $\frac{2^{-3} \cdot 2^{-4} \cdot 2^9 \cdot 2^7}{2^7 \cdot 2^{-2}} + 5^{-1} \cdot 5^3 - 2^{-1} \cdot 2^0 \cdot 2^4 - \frac{5^{-3}}{5^{-5}} =$

1. Realizar las siguientes operaciones combinadas con fracciones (3 puntos):

$$\begin{aligned} \text{a) } \frac{\frac{1}{4} + \frac{2}{6}}{\frac{2}{9}} - \frac{\frac{9}{10} - \frac{4}{5}}{1 - \frac{2}{5}} &= \frac{\frac{3}{12} + \frac{4}{12}}{\frac{2}{9}} - \frac{\frac{9}{10} - \frac{8}{10}}{\frac{5}{5} - \frac{2}{5}} = \frac{\frac{7}{12}}{\frac{2}{9}} - \frac{\frac{1}{10}}{\frac{3}{5}} = \\ &= \frac{63}{24} - \frac{5}{30} = \frac{315}{120} - \frac{20}{120} = \frac{295}{120} = \frac{59}{24} \end{aligned}$$

$$\begin{aligned} \text{b) } \frac{\frac{1}{4} - \frac{2}{5}}{\frac{2}{5} - \frac{1}{2}} + \frac{\frac{2}{5}}{\frac{1}{3}} - 1 &= \frac{\frac{5}{20} - \frac{8}{20}}{\frac{4}{10} - \frac{5}{10}} + \frac{\frac{2}{5}}{\frac{1}{3}} - 1 = \frac{-\frac{3}{20}}{-\frac{1}{10}} + \frac{\frac{2}{5}}{\frac{1}{3}} - 1 = \\ &= \frac{30}{20} + \frac{6}{5} - 1 = \frac{30}{20} + \frac{24}{20} - \frac{20}{20} = \frac{34}{20} = \frac{17}{10} \end{aligned}$$

2. Calcula (2 puntos):

$$\text{a) } 5^0 - 2^4 - (-5)^2 - 3^3 + (-6)^2 + 11^0 - 6^1 = 1 - 16 - 25 - 27 + 36 + 1 - 6 = \underline{\underline{-36}}$$

$$\text{b) } 3^1 - (-3)^3 - (-4)^2 + (-2)^5 + 9^2 + (-7)^0 = 3 + 27 - 16 - 32 + 81 + 1 = \underline{\underline{64}}$$

3. Efectúa las siguientes operaciones simplificando previamente las fracciones (2 puntos):

$$\begin{aligned} \text{a) } \left[ \left( \frac{3}{2} \div \frac{9}{4} \right)^3 \div \left( \frac{3}{4} \cdot \frac{2}{3} \cdot \frac{8}{3} \right)^2 \right] \cdot \left[ ((-4)^2 \cdot 3 - (-3)^2 \cdot 5) \cdot \left( \frac{1}{5} \div \frac{3}{10} \right)^2 \right] &= \\ = \left[ \left( \frac{12}{18} \right)^3 : \left( \frac{48}{36} \right)^2 \right] \cdot \left[ (48 - 45) \cdot \left( \frac{10}{15} \right)^2 \right] &= \left[ \left( \frac{2}{3} \right)^3 : \left( \frac{4}{3} \right)^2 \right] \cdot \left[ 3 \cdot \left( \frac{2}{3} \right)^2 \right] = \\ = \left( \frac{8}{27} : \frac{16}{9} \right) \cdot \left( 3 \cdot \frac{4}{9} \right) &= \left\{ \frac{72}{432} \cdot \frac{12}{9} = \frac{864}{3888} = \frac{2}{9} \right. \\ \text{dos formas} &= \left. \left\{ \frac{1}{6} \cdot \frac{4}{3} = \frac{4}{18} = \frac{2}{9} \right. \right. \end{aligned}$$

$$\begin{aligned} \text{b) } & \left(\frac{5}{4} - \frac{7}{10} - \frac{1}{20}\right)^3 \cdot \left(\frac{2}{3} \div \frac{1}{6}\right)^2 = \left(\frac{25}{20} - \frac{14}{20} - \frac{1}{20}\right)^3 \cdot \left(\frac{12}{3}\right)^2 = \\ & = \left(\frac{10}{20}\right)^3 \cdot \left(\frac{12}{3}\right)^2 = \left(\frac{1}{2}\right)^3 \cdot 4^2 = \frac{1}{8} \cdot 16 = \frac{16}{8} = \underline{\underline{2}} \end{aligned}$$

4. Expresa en forma de una sola potencia las siguientes expresiones (1 punto):

$$\text{a) } (-4)^4 \cdot 4^{-6} \cdot (-4)^8 \cdot 4^{-3} = 4^3$$

$$\text{b) } \left(-\frac{3}{7}\right)^6 \div \left(\frac{3}{7}\right)^{-5} = \left(\frac{3}{7}\right)^{11}$$

5. Calcula (2 puntos):

$$\begin{aligned} \text{a) } & \frac{3^3 \cdot 3^{-1}}{3^2} + \frac{5^2 \cdot 5^{-3} \cdot 5^9}{5^4 \cdot 5 \cdot 5^2} + 4^2 \cdot 4^{-3} \cdot 4^3 + 2^0 = \frac{3^2}{3^2} + \frac{5^8}{5^7} + 4^2 + 2^0 = \\ & = 3^0 + 5^1 + 4^2 + 2^0 = 1 + 5 + 16 + 1 = \underline{\underline{23}} \end{aligned}$$

$$\begin{aligned} \text{b) } & \frac{2^{-3} \cdot 2^{-4} \cdot 2^9 \cdot 2^7}{2^7 \cdot 2^{-2}} + 5^{-1} \cdot 5^3 - 2^{-1} \cdot 2^0 \cdot 2^4 - \frac{5^{-3}}{5^{-5}} = \frac{2^9}{2^5} + 5^2 - 2^3 - 5^2 = \\ & = 2^4 + 5^2 - 2^3 - 5^2 = 16 + 25 - 8 - 25 = \underline{\underline{8}} \end{aligned}$$