1. Resolver las siguientes operaciones con fracciones, simplificando en todo momento los pasos intermedios y el resultado. **(2 puntos; 1 punto por apartado)**

a) $\dfrac{\left(\frac{2}{5}-\frac{1}{3}\right):\left(1-\frac{1}{3}\cdot\frac{6}{5}\right)}{1-\left(\frac{2}{3}\cdot\frac{1}{3}-1\right)}+1=$ b) $\dfrac{3+\frac{3}{2+1/2}}{\frac{1}{15}+\left(\frac{3}{2}-\frac{1}{3}\cdot\frac{5}{2}\right)\cdot\frac{1}{5}}=$

2. Realiza las siguientes operaciones con potencias y simplifica el resultado todo lo posible *(se puede dejar el resultado en forma de potencia)*. **(2 puntos; 1 punto por apartado)**

a) $\dfrac{4^2\cdot 2^{-2}\cdot 9^{-3}\cdot 6^3}{12\cdot 3^{-3}\cdot 2\cdot 3^{-3}}=$ b) $\dfrac{\left(\frac{5}{4}\right)^{-3}\cdot\left(\frac{25}{4}\right)^3}{5^3\cdot\left(\frac{2}{5}\right)^{-2}\cdot\left(\frac{5}{2}\right)^{-3}\cdot\left(\frac{4}{5}\right)^2}=$

3. Opera y simplifica extrayendo factores siempre que sea posible (recuerda que has de factorizar los números que no sean primos): **(1 punto; 0,5 puntos por apartado)**

a) $\sqrt{16\ \sqrt[5]{64}}=$ b) $3\sqrt{2}+4\sqrt{8}-\sqrt{32}+\sqrt{50}=$

4. Racionaliza: **(1 punto; 0,5 puntos por apartado)**

a) $\dfrac{6}{\sqrt[3]{3}}=$ b) $\dfrac{9}{\sqrt{5}-\sqrt{2}}=$

5. Resuelve las siguientes ecuaciones: **(4 puntos; 1 punto por apartado)**

a) $\frac{1}{3}(x+2)-\frac{1}{5}(2x-3)=4-\frac{2x}{15}$ b) $\frac{x+5}{3}+\frac{x-3}{2}=\frac{x+5}{5}-\frac{3x}{15}$

c) $\frac{x(x+1)}{5}=2x^2-4x$ d) $\left(\frac{3}{2}x-2\right)^2-(x-1)(x+1)=-2$

① a) $\dfrac{\left(\frac{2}{5}-\frac{1}{3}\right):\left(1-\frac{1}{3}\cdot\frac{6}{5}\right)}{1-\left(\frac{2}{3}\cdot\frac{1}{3}-1\right)}+1=\dfrac{\left(\frac{6}{15}-\frac{5}{15}\right):\left(1-\frac{6}{15}\right)}{1-\left(\frac{2}{9}-1\right)}+1=$

$=\dfrac{\frac{1}{15}:\left(1-\frac{2}{5}\right)}{1-\left(\frac{2}{9}-\frac{9}{9}\right)}+1=\dfrac{\frac{1}{15}:\left(\frac{5}{5}-\frac{2}{5}\right)}{1-\left(-\frac{7}{9}\right)}+1=\dfrac{\frac{1}{15}:\frac{3}{5}}{1+\frac{7}{9}}+1=$

$=\dfrac{\frac{5}{45}}{\frac{9}{9}+\frac{7}{9}}+1=\dfrac{\frac{1}{9}}{\frac{16}{9}}+1=\dfrac{1\cdot 9}{9\cdot 16}+1=\dfrac{1}{16}+1=\dfrac{1}{16}+\dfrac{16}{16}=\underline{\underline{\dfrac{17}{16}}}$

b) $\dfrac{3+\frac{3}{2+1/2}}{\frac{1}{15}+\left(\frac{3}{2}-\frac{1}{3}\cdot\frac{5}{2}\right)\cdot\frac{1}{5}}=\dfrac{3+\frac{3}{5/2}}{\frac{1}{15}+\left(\frac{3}{2}-\frac{5}{6}\right)\frac{1}{5}}=\dfrac{3+\frac{6}{5}}{\frac{1}{15}+\left(\frac{9}{6}-\frac{5}{6}\right)\frac{1}{5}}=$

$=\dfrac{\frac{15}{5}+\frac{6}{5}}{\frac{1}{15}+\frac{4}{6}\cdot\frac{1}{5}}=\dfrac{\frac{21}{5}}{\frac{1}{15}+\frac{4}{30}}=\dfrac{\frac{21}{5}}{\frac{2}{30}+\frac{4}{30}}=\dfrac{\frac{21}{5}}{\frac{6}{30}}=\dfrac{\frac{21}{5}}{\frac{1}{5}}=\underline{\underline{21}}$

② a) $\dfrac{4^2\cdot 2^{-2}\cdot 9^{-3}\cdot 6^3}{12\cdot 3^{-3}\cdot 2\cdot 3^{-3}}=\dfrac{2^4\cdot 2^{-2}\cdot 3^{-6}\cdot 2^3\cdot 3^3}{2^2\cdot 3\cdot 3^{-3}\cdot 2\cdot 3^{-3}}=\dfrac{2^5\cdot 3^{-3}}{2^3\cdot 3^{-5}}=2^2\cdot 3^2=\underline{\underline{36}}$

b) $\dfrac{\left(\frac{5}{4}\right)^{-3}\cdot\left(\frac{25}{4}\right)^3}{5^3\cdot\left(\frac{2}{5}\right)^{-2}\left(\frac{5}{2}\right)^{-3}\left(\frac{4}{5}\right)^2}=\dfrac{\frac{5^{-3}}{2^{-6}}\cdot\frac{5^6}{2^6}}{5^3\,\frac{2^{-2}}{5^{-2}}\cdot\frac{5^{-3}}{2^{-3}}\cdot\frac{2^4}{5^2}}=\dfrac{\frac{5^3}{2^0}}{\frac{5^0\cdot 2^2}{5^0\cdot 2^{-3}}}=$

$=\dfrac{5^3\cdot 2^{-3}}{2^2}=5^3\cdot 2^{-5}=\dfrac{5^3}{2^5}=\underline{\underline{\dfrac{125}{32}}}$

③ a) $\sqrt{16\sqrt[5]{64}}=\sqrt{2^4\cdot\sqrt[5]{2^6}}=\sqrt{\sqrt[5]{(2^4)^5\cdot 2^6}}=$

$=\sqrt{\sqrt[5]{2^{20}\cdot 2^6}}=\sqrt[10]{2^{26}}=2^2\cdot\sqrt[10]{2^6}=4\cdot\sqrt[5]{2^3}=\underline{\underline{4\sqrt[5]{8}}}$

b) $3\sqrt{2}+4\sqrt{8}-\sqrt{32}+\sqrt{50}=3\sqrt{2}+4\sqrt{2^3}-\sqrt{2^5}+\sqrt{2\cdot 5^2}=$

$=3\sqrt{2}+4\cdot 2\sqrt{2}-2^2\sqrt{2}+5\sqrt{2}=3\sqrt{2}+8\sqrt{2}-4\sqrt{2}+5\sqrt{2}=$

$=(3+8-4+5)\sqrt{2}=\underline{\underline{12\sqrt{2}}}$

④ a) $\frac{6}{\sqrt[3]{3}} = \frac{6\sqrt[3]{3^2}}{\sqrt[3]{3}\sqrt[3]{3^2}} = \frac{6\sqrt[3]{9}}{\sqrt[3]{3^3}} = \frac{6\sqrt[3]{9}}{3} = \underline{\underline{2\sqrt[3]{9}}}$

b) $\frac{9}{\sqrt{5}-\sqrt{2}} = \frac{9(\sqrt{5}+\sqrt{2})}{(\sqrt{5}-\sqrt{2})(\sqrt{5}+\sqrt{2})} = \frac{9(\sqrt{5}+\sqrt{2})}{\sqrt{5}^2-\sqrt{2}^2} = \frac{9(\sqrt{5}+\sqrt{2})}{3} = \underline{\underline{3(\sqrt{5}+\sqrt{2})}}$

⑤ a) $\frac{1}{3}(x+2) - \frac{1}{5}(2x-3) = 4 - \frac{2x}{15} \Rightarrow$ (multiplicando por 15)

$5(x+2) - 3(2x-3) = 60 - 2x \Rightarrow 5x+10-6x+9 = 60-2x$

$\Rightarrow -x+19 = 60-2x \Rightarrow -x+2x = 60-19 \Rightarrow \underline{\underline{x=41}}$

b) $\frac{x+5}{3} + \frac{x-3}{2} = \frac{x+5}{5} - \frac{3x}{15} \Rightarrow$ (multiplicando por 30)

$10(x+5) + 15(x-3) = 6(x+5) - 6x \Rightarrow$

$\Rightarrow 10x+50+15x-45 = 6x+30-6x \Rightarrow 25x+5 = 30$

$\Rightarrow 25x = 30-5 \Rightarrow 25x = 25 \Rightarrow x = \frac{25}{25} \Rightarrow \underline{\underline{x=1}}$

c) $\frac{x(x+1)}{5} = 2x^2 - 4x \Rightarrow$ (multiplicando por 5)

$x(x+1) = 10x^2 - 20x \Rightarrow x^2+x = 10x^2-20x \Rightarrow$

$\Rightarrow x^2+x-10x^2+20x = 0 \Rightarrow -9x^2+21x = 0 \Rightarrow$

$\Rightarrow x(-9x+21) = 0$ / $\underline{\underline{x=0}}$

\ $-9x+21 = 0 \Rightarrow -9x = -21$

$\Rightarrow x = \frac{-21}{-9} \Rightarrow \underline{\underline{x = \frac{7}{3}}}$

d) $\left(\frac{3}{2}x-2\right)^2 - (x-1)(x+1) = -2 \Rightarrow$

$\Rightarrow \frac{9}{4}x^2 - 6x + 4 - (x^2-1) = -2 \Rightarrow$ (multiplicando por 4)

$\Rightarrow 9x^2-24x+16-4x^2+4 = -8 \Rightarrow 5x^2-24x+28 = 0$

$\Delta = b^2-4ac = (-24)^2 - 4\cdot 5\cdot 28 = 576-560 = 16$

$x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{24 \pm \sqrt{16}}{10} = \frac{24 \pm 4}{10} =$ / $\frac{28}{10} = \underline{\underline{\frac{14}{5}}}$

\ $\frac{20}{10} = \underline{\underline{2}}$