01) Simplifique o máximo a expressão $\dfrac{x^2\left(-1+\dfrac{y^2}{x^2}\right)}{\left(\sqrt{x}+\sqrt{y}\right)^2-2\sqrt{xy}}$?

$$\frac{x^2\left(-1+\frac{y^2}{x^2}\right)}{\left(\sqrt{x}+\sqrt{y}\right)^2-2\sqrt{xy}}=\frac{-x^2+y^2}{x+\cancel{2\sqrt{xy}}+y-\cancel{2\sqrt{xy}}}=\frac{y^2-x^2}{x+y}=\frac{(x-y)\cdot\cancel{(x+y)}}{\cancel{x+y}}=x-y$$

02) Simplifique

$$\sqrt{2+\sqrt{3}}\cdot\sqrt{2+\sqrt{2+\sqrt{3}}}\cdot\sqrt{2-\sqrt{2+\sqrt{3}}}=\sqrt{2+\sqrt{3}}\cdot\sqrt{\left(2+\sqrt{2+\sqrt{3}}\right)\cdot\left(2-\sqrt{2+\sqrt{3}}\right)}=$$

$$\sqrt{2+\sqrt{3}}\cdot\sqrt{2^2-\left(2+\sqrt{3}\right)}=\sqrt{2+\sqrt{3}}\cdot\sqrt{2-\sqrt{3}}=\sqrt{\left(2+\sqrt{3}\right)\cdot\left(2-\sqrt{3}\right)}=\sqrt{2^2+3}=\sqrt{1}=1$$

03) Racionalize os seguintes denominadores das frações algébricas:

a) $\dfrac{b}{\sqrt[5]{a^3b}}\cdot\dfrac{\sqrt[5]{a^2b^4}}{\sqrt[5]{a^2b^4}}=\dfrac{b\cdot\sqrt[5]{a^2b^4}}{\sqrt[5]{a^5b^5}}=a\cdot\sqrt[5]{a^2b^4}$

b) $\dfrac{2}{\sqrt{3}+1}\cdot\dfrac{\sqrt{3}-1}{\sqrt{3}-1}=\dfrac{2\cdot\left(\sqrt{3}-1\right)}{3-1}=\sqrt{3}-1$