

Resolução da atividade principal - MAT9_02NUM09

Os grupos serão nomeados e dividiremos a lousa para que cada equipe fique com uma parte. A pontuação de cada equipe será dado por 10 dividido pelo tempo utilizado para resolver o exercício.

Por exemplo, se uma equipe A demorou 2 minutos e outra equipe B demorou 3 minutos.

Equipe A:

$$\frac{10}{2 \text{ minutos}} = 5 \text{ pontos}$$

Equipe B:

$$\frac{10}{3 \text{ minutos}} = 3,3 \text{ pontos}$$

Em seguida serão apresentados expressões a serem resolvidas com expoentes fracionários.

Ao terminar, o grupo deve ir até a lousa e colocar sua resposta. Todos terão um tempo para justificar seus resultados.

$$\begin{aligned} 1) & 2^{\frac{2}{5}} \times 2^{\frac{4}{3}} \\ & 2^{\frac{2}{5}} \times 2^{\frac{4}{3}} = 2^{\frac{2}{5} + \frac{4}{3}} \\ & \frac{2}{5} + \frac{4}{3} = \frac{6+20}{15} = \frac{26}{15} \\ & 2^{\frac{2}{5} + \frac{4}{3}} = 2^{\frac{26}{15}} \\ & 2^{\frac{26}{15}} = \sqrt[15]{2^{26}} \end{aligned}$$

$$2) \frac{3^{\frac{3}{4}}}{3^{\frac{5}{2}}}$$

$$\frac{3^{\frac{3}{4}}}{3^{\frac{5}{2}}} = 3^{\frac{3}{4}} \times 3^{-\frac{5}{2}} = 3^{\frac{3-10}{4}}$$

$$3^{\frac{3-10}{4}} = 3^{\frac{-6}{4}} = 3^{\frac{-3}{2}}$$

$$3^{\frac{-3}{2}} = \frac{1}{3^{\frac{3}{2}}} = \frac{1}{\sqrt[2]{3^3}}$$

$$\frac{1}{\sqrt[2]{3^3}} = \frac{1}{3\sqrt[2]{3}} = \frac{1}{3\sqrt[2]{3}} \times \frac{\sqrt[2]{3}}{\sqrt[2]{3}}$$

$$\frac{1}{3\sqrt[2]{3}} \times \frac{\sqrt[2]{3}}{\sqrt[2]{3}} = \frac{\sqrt[2]{3}}{9}$$

$$3) 625^{0,25} + 243^{0,2}$$

$$625^{0,25} + 243^{0,2} = 625^{\frac{1}{4}} + 243^{\frac{1}{5}}$$

$$625^{\frac{1}{4}} + 243^{\frac{1}{5}} = (5^4)^{\frac{1}{4}} + (3^5)^{\frac{1}{5}}$$

$$(5^4)^{\frac{1}{4}} + (3^5)^{\frac{1}{5}} = 5^{\frac{4}{4}} + 3^{\frac{5}{5}}$$

$$5^{\frac{4}{4}} + 3^{\frac{5}{5}} = 5 + 3 = 8$$

$$4) 32^{\frac{3}{5}} - 27^{\frac{2}{3}}$$

$$32^{\frac{3}{5}} - 27^{\frac{2}{3}} = (2^5)^{\frac{3}{5}} - (3^3)^{\frac{2}{3}}$$

$$(2^5)^{\frac{3}{5}} - (3^3)^{\frac{2}{3}} = 2^{\frac{5 \times 3}{5}} - 3^{\frac{3 \times 2}{3}}$$

$$2^{\frac{5 \times 3}{5}} - 3^{\frac{3 \times 2}{3}} = 2^3 - 3^2$$

$$2^3 - 3^2 = 8 - 9 = -1$$

$$5) \left(5^{\frac{7}{4}}\right)^{\frac{3}{14}}$$

$$\left(5^{\frac{7}{4}}\right)^{\frac{3}{14}} = 5^{\frac{7}{4} \times \frac{3}{14}}$$

$$5^{\frac{7}{4} \times \frac{3}{14}} = 5^{\frac{21}{42}}$$

$$5^{\frac{21}{42}} = 5^{\frac{1}{2}}$$

$$5^{\frac{1}{2}} = \sqrt{5}$$

$$6) \sqrt[4]{\sqrt[3]{3} \times \sqrt[6]{16}}$$

$$\sqrt[4]{\sqrt[3]{3} \times \sqrt[6]{16}} = \left(3^{\frac{1}{3}} \times 16^{\frac{1}{6}}\right)^{\frac{1}{4}}$$

$$\left(3^{\frac{1}{3}} \times 16^{\frac{1}{6}}\right)^{\frac{1}{4}} = \left(3^{\frac{1}{3}} \times (4^2)^{\frac{1}{6}}\right)^{\frac{1}{4}}$$

$$\left(3^{\frac{1}{3}} \times (4^2)^{\frac{1}{6}}\right)^{\frac{1}{4}} = \left(3^{\frac{1}{3}} \times 4^{\frac{1}{3}}\right)^{\frac{1}{4}}$$

$$\left(3^{\frac{1}{3}} \times 4^{\frac{1}{3}}\right)^{\frac{1}{4}} = \left[(3 \times 4)^{\frac{1}{3}}\right]^{\frac{1}{4}}$$

$$\left[(3 \times 4)^{\frac{1}{3}}\right]^{\frac{1}{4}} = 12^{\frac{1}{3} \times \frac{1}{4}}$$

$$12^{\frac{1}{3} \times \frac{1}{4}} = 12^{\frac{1}{12}}$$

$$12^{\frac{1}{12}} = \sqrt[12]{12}$$

$$7) \sqrt[3]{\frac{\sqrt[5]{2^{7,5}}}{\sqrt[3]{729}}}$$

$$\sqrt[3]{\frac{\sqrt[5]{2^{7,5}}}{\sqrt[3]{729}}} = \left(\frac{2^{\frac{7,5}{5}}}{729^{\frac{1}{3}}}\right)^{\frac{1}{3}}$$

$$\left(\frac{2^{\frac{7,5}{5}}}{729^{\frac{1}{3}}}\right)^{\frac{1}{3}} = \left(\frac{2^{\frac{7,5}{5}}}{(3^6)^{\frac{1}{3}}}\right)^{\frac{1}{3}}$$

$$\left(\frac{2^{\frac{7,5}{5}}}{(3^6)^{\frac{1}{3}}}\right)^{\frac{1}{3}} = \frac{2^{\frac{7,5}{5} \times \frac{1}{3}}}{(3^6)^{\frac{1}{3} \times \frac{1}{3}}}$$

$$\frac{2^{\frac{7,5}{5} \times \frac{1}{3}}}{(3^6)^{\frac{1}{3} \times \frac{1}{3}}} = \frac{2^{\frac{7,5}{15}}}{(3^6)^{\frac{1}{6}}}$$

$$\frac{2^{\frac{7,5}{15}}}{(3^6)^{\frac{1}{6}}} = \frac{2^{\frac{7,5}{15}}}{3^{\frac{6}{6}}}$$

$$\frac{2^{\frac{7,5}{15}}}{3^{\frac{6}{6}}} = \frac{2^{\frac{1}{2}}}{3}$$

$$\frac{2^{\frac{1}{2}}}{3} = \frac{\sqrt{2}}{3}$$

$$8) \left(\sqrt[2]{7^3} \times \sqrt[3]{5^{4,5}} \right)^{\frac{2}{12}}$$

$$\left(\sqrt[2]{7^3} \times \sqrt[3]{5^{4,5}} \right)^{\frac{2}{12}} = \left(7^{\frac{3}{2}} \times 5^{\frac{4,5}{3}} \right)^{\frac{2}{12}}$$

$$\left(7^{\frac{3}{2}} \times 5^{\frac{4,5}{3}} \right)^{\frac{2}{12}} = 7^{\frac{3}{2} \times \frac{2}{12}} \times 5^{\frac{4,5}{3} \times \frac{2}{12}}$$

$$7^{\frac{3}{2} \times \frac{2}{12}} \times 5^{\frac{4,5}{3} \times \frac{2}{12}} = 7^{\frac{6}{24}} \times 5^{\frac{9}{36}}$$

$$7^{\frac{6}{24}} \times 5^{\frac{9}{36}} = 7^{\frac{1}{4}} \times 5^{\frac{1}{4}}$$

$$7^{\frac{1}{4}} \times 5^{\frac{1}{4}} = (7 \times 5)^{\frac{1}{4}}$$

$$(7 \times 5)^{\frac{1}{4}} = \sqrt[4]{35}$$

$$9) \left(\frac{\sqrt{6^3}}{\sqrt[3]{5^2}} \right)^{\frac{6}{5}}$$

$$\left(\frac{\sqrt{6^3}}{\sqrt[3]{5^2}} \right)^{\frac{6}{5}} = \left(\frac{6^{\frac{3}{2}}}{5^{\frac{2}{3}}} \right)^{\frac{6}{5}}$$

$$\left(\frac{6^{\frac{3}{2}}}{5^{\frac{2}{3}}}\right)^{\frac{6}{5}} = \frac{6^{\frac{3}{2} \times \frac{6}{5}}}{5^{\frac{2}{3} \times \frac{6}{5}}}$$

$$\frac{6^{\frac{3}{2} \times \frac{6}{5}}}{5^{\frac{2}{3} \times \frac{6}{5}}} = \frac{6^{\frac{9}{5}}}{5^{\frac{4}{5}}}$$

$$\frac{6^{\frac{9}{5}}}{5^{\frac{4}{5}}} = \left(\frac{6^9}{5^4}\right)^{\frac{1}{5}}$$

$$\left(\frac{6^9}{5^4}\right)^{\frac{1}{5}} = \sqrt[5]{\frac{6^9}{5^4}}$$

$$10) \frac{\sqrt[4]{3} \times \sqrt[12]{5^3}}{\sqrt[8]{6^2}}$$

$$\frac{\sqrt[4]{3} \times \sqrt[12]{5^3}}{\sqrt[8]{6^2}} = \frac{3^{\frac{1}{4}} \times 5^{\frac{3}{12}}}{6^{\frac{2}{8}}}$$

$$\frac{3^{\frac{1}{4}} \times 5^{\frac{3}{12}}}{6^{\frac{2}{8}}} = \frac{3^{\frac{1}{4}} \times 5^{\frac{1}{4}}}{6^{\frac{1}{4}}}$$

$$\frac{3^{\frac{1}{4}} \times 5^{\frac{1}{4}}}{6^{\frac{1}{4}}} = \left(\frac{3 \times 5}{6}\right)^{\frac{1}{4}}$$

$$\left(\frac{3 \times 5}{6}\right)^{\frac{1}{4}} = \left(\frac{5}{2}\right)^{\frac{1}{4}}$$

$$\left(\frac{5}{2}\right)^{\frac{1}{4}} = \sqrt[4]{\frac{5}{2}}$$