

INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

6. Algebraické výrazy, mocniny a odmocniny

$$1. \left( a - \frac{4ab}{a+b} + b \right) : \left( \frac{a}{a+b} - \frac{b}{b-a} - \frac{2ab}{a^2-b^2} \right) = [a-b]$$

$$2. \left( \frac{m^2+n^2}{m^2-n^2} - \frac{m^2-n^2}{m^2+n^2} \right) : \left( \frac{m+n}{m-n} - \frac{m-n}{m+n} \right) = \left[ \frac{mn}{m^2+n^2} \right]$$

$$3. \frac{\frac{a+b}{a-b} - \frac{a-b}{a+b}}{1 - \frac{a^2+b^2}{a^2-b^2}} \cdot \frac{2 - \frac{1+b^2}{b}}{\frac{1}{b^2} - \frac{2}{b} + 1} = [2a]$$

$$4. \left[ \left( \frac{x}{y} - \frac{y}{x} \right) : (x+y) + x \cdot \left( \frac{1}{y} - \frac{1}{x} \right) \right] : \frac{1+x}{y} = \left[ \frac{x-y}{x} \right]$$

$$5. \frac{\left( \frac{a}{b} + 1 \right)^2}{\left( \frac{a}{b} - \frac{b}{a} \right)} \cdot \frac{\frac{a^3}{b^3} - 1}{\frac{a^2}{b^2} + \frac{a}{b} + 1} : \frac{\frac{a^3}{b^3} + 1}{\frac{a}{b} + \frac{b}{a} - 1} = [1]$$

$$6. \left[ \frac{1}{(x+y)^2} \cdot \left( \frac{1}{x^2} + \frac{1}{y^2} \right) + \frac{2}{(x+y)^3} \cdot \left( \frac{1}{x} + \frac{1}{y} \right) \right] : \frac{y}{x^2} = \left[ \frac{1}{y^3} \right]$$

$$7. \frac{x^3+y^3}{(x+y)} : (x^2-y^2) + \frac{2y}{x+y} - \frac{xy}{x^2-y^2} = [1]$$

$$8. \left( \frac{2}{a+2} - \frac{a+1}{a^2-9} - \frac{1}{a+3} \right) : \frac{a+7}{a^2-a-6} = \left[ -\frac{2}{a+3} \right]$$

$$9. \left\{ \left[ \left( \frac{a+1}{a-1} \right)^2 + 3 \right] : \left[ \left( \frac{a-1}{a+1} \right)^2 + 3 \right] \right\} : \frac{a^3+1}{a^3-1} - \frac{2a}{a-1} = [-1]$$

$$10. \frac{a^2-1}{n^2+an} \cdot \left( \frac{1}{1-\frac{1}{n}} - 1 \right) \cdot \frac{a-an^3-n^4+n}{1-a^2} = \left[ \frac{n^2+n+1}{n} \right]$$

INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

$$11. \frac{a^4 - b^4}{a^2 b^2} : \left[ \left( 1 + \frac{b^2}{a^2} \right) \cdot \left( 1 - \frac{2a}{b} + \frac{a^2}{b^2} \right) \right] = \left[ \frac{a+b}{a-b} \right]$$

$$12. \left( \frac{1}{3a-b} + \frac{3ab-4}{27a^3-b^3} \right) : \left( \frac{1}{9a^2+3ab+b^2} + \frac{2-2b}{b^3-27a^3} \right) = [3a+b+2]$$

$$13. \frac{\frac{a^2+1}{a-1} - a}{\frac{a^2-1}{a+1} + 1} \cdot \left( 1 - \frac{2}{1+\frac{1}{a}} \right) = \left[ -\frac{1}{a} \right]$$

$$14. \left[ b^2 - \frac{a}{1 + \left( \frac{b-a}{a} \right)^{-1}} \cdot \left( \frac{ab}{b-a} - a \right) \right] : \frac{a^2 + ab + b^2}{b} = [b-a]$$

$$15. \left( \frac{a^{\frac{3}{2}} + b^{\frac{3}{2}}}{a-b} - \frac{a-b}{a^{\frac{1}{2}} + b^{\frac{1}{2}}} \right) \cdot \left( \sqrt{ab} \cdot \frac{\sqrt{a} + \sqrt{b}}{a-b} \right)^{-1} = [1]$$

$$16. x^3 \sqrt[3]{x\sqrt{x}} \cdot \left[ \frac{(\sqrt[4]{x} + \sqrt[4]{y})^2 + (\sqrt[4]{x} - \sqrt[4]{y})^2}{x + \sqrt{xy}} \right]^5 = [32x]$$

$$17. \sqrt{x^3 \sqrt{x^2}} + 4\sqrt[3]{x\sqrt{x}} - 2x\sqrt[3]{\frac{1}{\sqrt{x}}} + 3x\sqrt{x}^{\frac{1}{3}} = [2\sqrt{x}(\sqrt[3]{x} + 2)]$$

$$18. \left( \frac{a\sqrt{2}}{2\sqrt{a}} \right)^{\frac{1}{4}} : \left( \frac{2a^{-1}}{\sqrt[4]{2a^4}} \right)^{\frac{1}{2}} \cdot \left[ \frac{3^4 a^{2.5} (6a)^{-\frac{1}{2}}}{\sqrt[9]{27}} \right]^{-1} = [a]$$

$$19. \left[ \frac{\frac{1}{a} - a}{\left( \sqrt[3]{a} + \sqrt[3]{\frac{1}{a}} + 1 \right) \left( \sqrt[3]{a} + \sqrt[3]{\frac{1}{a}} - 1 \right)} + \sqrt[3]{a} \right]^{-3} = [substituce : \sqrt[3]{a} = t; a]$$

$$20. \left( \frac{1}{b-\sqrt{a}} - \frac{1}{b+\sqrt{a}} \right) : \frac{3a^{-2}b^{-1}}{a^{-2} - b^{-2} \cdot a^{-1}} = \left[ \frac{2\sqrt{a}}{3b} \right]$$

INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

$$21. \frac{\left[ (x-y)^{\frac{3}{5}} \right]^{\frac{-4}{3}} + \sqrt[10]{(x-y)^{-8}}}{\sqrt[5]{(x-y)^{-2}}} \cdot \frac{x-y}{\sqrt[5]{(x-y)^3}} = [2]$$

$$22. \left[ \frac{\left( a^{\frac{1}{4}} \cdot b^{-1} \right)^{-1}}{c^{-2} \cdot d^{\frac{1}{2}}} \right]^{-3} \cdot \left[ \frac{a^{\frac{3}{4}} \cdot \sqrt[3]{b^2} \cdot \sqrt{d^5}}{\left( c^{\frac{3}{2}} \right)^4} \right]^{-1} = \left[ b^{-\frac{11}{3}} d^{-1} \right]$$

$$23. \left\{ 1 + \left[ x \cdot (1-x^2)^{-\frac{1}{2}} \right]^2 \right\}^{-1} : \left[ \frac{(x^0)^{-\frac{1}{3}}}{1-x} \right]^{-1} = [1+x]$$

$$24. \left( \frac{4a - 9a^{-1}}{2a^{\frac{1}{2}} - 3a^{-\frac{1}{2}}} + \frac{a - 4 + 3a^{-1}}{a^{\frac{1}{2}} - a^{-\frac{1}{2}}} \right)^2 = [9a]$$

$$25. \left[ (a^{0.5} + b^{0.5})^2 - \left( \frac{\sqrt{a} - \sqrt{b}}{a^{1.5} - b^{1.5}} \right)^{-1} \right] \cdot (ab)^{-0.5} = [1]$$

$$26. \frac{(x-y)^3 \cdot (\sqrt{x} + \sqrt{y})^{-3} + 2x\sqrt{x} + y\sqrt{y}}{x\sqrt{x} + y\sqrt{y}} + \frac{3(\sqrt{x}\sqrt{y} - x)}{x-y} = [substituce \sqrt{x} = t; \sqrt{y} = z; 0]$$

$$27. \left[ \frac{3x^{\frac{1}{3}}}{x^{\frac{2}{3}} - 2x^{-\frac{1}{3}}} - \frac{x^{\frac{1}{3}}}{x^{\frac{4}{3}} - x^{\frac{1}{3}}} \right]^{-1} - \left( \frac{1-2x}{3x-2} \right)^{-1} = \left[ \frac{x^2}{2x-1} \right]$$