

026 TECT 1

$$p0) \left(\frac{a^{2,5} + a^{1,5}}{1+a} + 1 \right) : \frac{1-a^3}{1-a^{1,5}}$$

$$\begin{aligned} 1) \frac{a^{1,5}(a+1)}{1+a} &= a^{1,5} \cdot 1 = \frac{1-a^3}{1-a^{1,5}} = \\ &= \frac{(a^{1,5}+1)(a-a^{1,5})}{1-a^3} = \frac{1-(a^{1,5})^2}{1-a^3} = \frac{1-a^3}{1-a^3} = 1 \end{aligned}$$

Orbet: 1

$$1) \frac{a-b}{\sqrt{a}-\sqrt{b}} = \frac{a+\sqrt{a}b}{\sqrt{a}+\sqrt{b}}$$

$$1) \frac{a-b}{\sqrt{a}-\sqrt{b}} = \frac{(\sqrt{a}-\sqrt{b})(\sqrt{a}+\sqrt{b})}{(\sqrt{a}-\sqrt{b})} = \sqrt{a}+\sqrt{b}$$

$$2) \frac{(\sqrt{a}+\sqrt{b})^2}{\sqrt{a}+\sqrt{b}} = \frac{a+\sqrt{a}b}{\sqrt{a}+\sqrt{b}} = \frac{a^2+2\sqrt{a}b+b-a+2\sqrt{a}b}{\sqrt{a}+\sqrt{b}}$$

$$= \frac{b+2\sqrt{a}b}{\sqrt{a}+\sqrt{b}} = \frac{\sqrt{b}(\sqrt{b}+\sqrt{a})}{\sqrt{a}+\sqrt{b}} = \sqrt{b}$$

Orbet: \sqrt{b}

$$12) \frac{a-b}{a+b+2\sqrt{ab}} = \frac{a^{-\frac{1}{2}} - b^{-\frac{1}{2}}}{a^{-\frac{1}{2}} + b^{-\frac{1}{2}}}$$

$$1) a^{-\frac{1}{2}} - b^{-\frac{1}{2}} = \frac{1}{\sqrt{a}} - \frac{1}{\sqrt{b}} = \frac{\sqrt{a} - \sqrt{b}}{\sqrt{ab}}$$

$$2) a^{-\frac{1}{2}} + b^{-\frac{1}{2}} = \frac{\sqrt{a} + \sqrt{b}}{\sqrt{ab}}$$

$$3) \frac{\sqrt{a} - \sqrt{b}}{\sqrt{ab}} \cdot \frac{\sqrt{ab}}{\sqrt{a} + \sqrt{b}} = \frac{\sqrt{a} - \sqrt{b}}{\sqrt{a} + \sqrt{b}}$$

$$4) a - b = (\sqrt{a} - \sqrt{b})(\sqrt{a} + \sqrt{b})$$

$$5) a + b + 2\sqrt{ab} = (\sqrt{a} + \sqrt{b})^2$$

$$6) \frac{(\sqrt{a} - \sqrt{b})(\sqrt{a} + \sqrt{b})}{(\sqrt{a} + \sqrt{b})^2} = \frac{(\sqrt{a} - \sqrt{b})}{(\sqrt{a} + \sqrt{b})}$$

$$7) \frac{\sqrt{a} - \sqrt{b}}{\sqrt{a} + \sqrt{b}} \cdot \frac{\sqrt{a} + \sqrt{b}}{\sqrt{a} - \sqrt{b}} = 1$$

Ergebnis: 1

$$14) \left(\frac{a\sqrt{a} + b\sqrt{b}}{\sqrt{a} + \sqrt{b}} - \sqrt{ab} \right) \cdot \left(\frac{\sqrt{a} + \sqrt{b}}{a+b} \right)^2$$

$$\frac{1(\sqrt{a} + \sqrt{b})}{(\sqrt{a} + \sqrt{b})(\sqrt{a} - \sqrt{b})} = \frac{1}{(\sqrt{a} - \sqrt{b})^2}$$

$$\frac{a\sqrt{a} + b\sqrt{b}}{\sqrt{a} + \sqrt{b}} = \frac{(\sqrt{a}\sqrt{b}(a+b-\sqrt{ab}))}{\sqrt{a} + \sqrt{b}} = a+b - \sqrt{ab}$$

$$\Rightarrow a+b - \sqrt{ab} - \sqrt{ab} = a+b - 2\sqrt{ab} = (\sqrt{a} - \sqrt{b})^2$$

$$\Rightarrow (\sqrt{a} - \sqrt{b})^2 \cdot \frac{1}{(\sqrt{a} - \sqrt{b})^2} = 1$$

Answer: 1

$$14) \left(\frac{a\sqrt{a} + b\sqrt{b}}{\sqrt{a} + \sqrt{b}} - \sqrt{ab} \right) \cdot \left(\frac{\sqrt{a} + \sqrt{b}}{a-b} \right)^2$$

$$\frac{1}{\left(\frac{\sqrt{a} + \sqrt{b}}{\sqrt{a} + \sqrt{b}} \right)^2} = \frac{1}{(\sqrt{a} - \sqrt{b})^2}$$

$$\frac{a\sqrt{a} + b\sqrt{b}}{\sqrt{a} + \sqrt{b}} = \frac{(\sqrt{a} + \sqrt{b})(a + b - \sqrt{ab})}{\sqrt{a} + \sqrt{b}} = a + b - \sqrt{ab}$$

$$a + b - \sqrt{ab} - \sqrt{ab} = a + b - 2\sqrt{ab} = (\sqrt{a} - \sqrt{b})^2$$

$$(\sqrt{a} - \sqrt{b})^2 = \frac{1}{(\sqrt{a} - \sqrt{b})^2} = 1$$

Answer: 1

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

$$1) \frac{2}{b-\sqrt{ab}} + \frac{2}{b+\sqrt{ab}} = \frac{2b+2\sqrt{ab}+2b-2\sqrt{ab}}{b^2-ab} = \frac{4b}{b^2-ab}$$

$$2) \frac{\sqrt{a}-\sqrt{b}}{\sqrt{a}} + \frac{\sqrt{b}}{\sqrt{a}-\sqrt{b}} = \frac{(\sqrt{a}-\sqrt{b})^2 + \sqrt{a} \cdot \sqrt{b}}{\sqrt{a}(\sqrt{a}-\sqrt{b})}$$

$$3) a + \frac{b^{\frac{3}{2}}}{\sqrt{a}} = \frac{a\sqrt{a} + b\sqrt{b}}{\sqrt{a}} = \frac{(\sqrt{a}+\sqrt{b})(a+\sqrt{ab}+b)}{\sqrt{a}}$$

$$4) \left(\frac{(\sqrt{a}+\sqrt{b})(a+b-\sqrt{ab})}{\sqrt{a}} \right) \cdot \frac{\sqrt{a}(\sqrt{a}-\sqrt{b})}{(\sqrt{a}-\sqrt{b})^2 + \sqrt{ab}} =$$

$$= \frac{(a-b)(a+b-\sqrt{ab})}{(\sqrt{a}-\sqrt{b})^2 + \sqrt{ab}} = \frac{(\sqrt{a}-\sqrt{b})(\sqrt{a}+\sqrt{b})(a+b-\sqrt{ab})}{(\sqrt{a}-\sqrt{b})^2 + \sqrt{ab}}$$

$$= \frac{\sqrt{a}+\sqrt{b}}{\sqrt{a}-\sqrt{b}+\sqrt{ab}} = (a-b)$$

$$5) 4b \cdot (a-b) = 4ab - b^2 = 4b(a-b)$$

$$4) \frac{(a-b)(a+b-\sqrt{ab})}{a+b-2\sqrt{ab}+b} = a-b$$

$$b) \quad \sqrt{a} - \frac{a - a^{-2}}{\sqrt{a} - \frac{1}{\sqrt{a}}} + \frac{1 - a^{-2}}{\sqrt{a} + \frac{1}{\sqrt{a}}} + \frac{2}{\sqrt{a}}$$

$$1) \quad a - a^{-2} = a - \frac{1}{a^2} = \frac{a^3 - 1}{a^2}$$

$$2) \quad 1 - a^{-2} = 1 - \frac{1}{a^2} = \frac{a^2 - 1}{a^2}$$

$$b) \quad \sqrt{a} - \frac{1}{\sqrt{a}} = \frac{a-1}{\sqrt{a}}$$

$$a) \quad \frac{a^3 - 1}{a^2} \cdot \frac{\sqrt{a}}{a-1} = \frac{(a^2 + a + 1) \cdot \sqrt{a}}{a^2}$$

$$b) \quad \frac{a^2 - 1}{a^2} \cdot \frac{\sqrt{a}}{a+1} = \frac{(a-1) \cdot \sqrt{a}}{a^2}$$

$$c) \quad \frac{(a^2 + a + 1) \cdot \sqrt{a}}{a^2 a} + \frac{a-1}{a^2 a} = \frac{a^2 + 2a + 2}{a^2 a}$$

$$d) \quad \sqrt{a} - \frac{a^2 + 2a + 2}{a^2 a} = a^2 - a^2 - 2a - 2 = -\frac{(2a+2)}{a^2 a}$$

$$e) \quad -\frac{(2a+2)}{a^2 a} + \frac{2}{\sqrt{a}} = \frac{-2a-2+2a}{a^2 a} = \frac{-2}{a^2 a}$$

$$\text{Answer: } \frac{-2}{a^2 a}$$