

$$\text{_____ (1)}$$

μ 1o.

i. μ , μ ; (10 μ)

ii. μ μ μ x ; (10 μ)

iii. $|\alpha \cdot \beta| = |\alpha| \cdot |\beta|$. (10 μ)

μ 2o.

$$A = \sqrt{30} - \sqrt{5} \quad B = \sqrt{30} + \sqrt{5}$$

i) $A^2 + B^2 = 70$ μ 10

ii) $\sqrt[3]{5} \cdot \sqrt[3]{A} \cdot \sqrt[3]{B} = 5$ μ 10

iii) $\frac{\sqrt{30}}{2A} + \frac{\sqrt{30}}{2B} = \frac{6}{5}$ μ 10

μ 3o.

$$= |x+4| \quad = |x-4| , x \in \mathbb{R} .$$

) $A^2 + B^2 = 2x^2 + 32$ μ 15

) $A + B = 8 \quad -4 < x < 4$ μ 15

) $A^2 + B^2 \geq 16x$ μ 10

μ 1o.

μ 2o.

$$\text{i) } A^2 + B^2 = (\sqrt{30} - \sqrt{5})^2 + (\sqrt{30} + \sqrt{5})^2 = \sqrt{30}^2 - 2 \cdot \sqrt{30} \cdot \sqrt{5} + \sqrt{5}^2 + \sqrt{30}^2 + 2 \cdot \sqrt{30} \cdot \sqrt{5} + \sqrt{5}^2 = 30 + 5 + 30 + 5 = 70$$

$$\text{ii) } \sqrt[3]{5} \cdot \sqrt[3]{A} \cdot \sqrt[3]{B} = \sqrt[3]{5} \cdot \sqrt[3]{\sqrt{30} - \sqrt{5}} \cdot \sqrt[3]{\sqrt{30} + \sqrt{5}} = \sqrt[3]{5 \cdot (\sqrt{30} - \sqrt{5}) \cdot (\sqrt{30} + \sqrt{5})} = \sqrt[3]{5 \cdot [(\sqrt{30})^2 - (\sqrt{5})^2]} = \sqrt[3]{5 \cdot (30 - 5)} = \sqrt[3]{5 \cdot 25} = \sqrt[3]{125} = 5$$

$$\text{iii) } \frac{\sqrt{30}}{2A} + \frac{\sqrt{30}}{2B} = \frac{\sqrt{30}}{2(\sqrt{30} - \sqrt{5})} + \frac{\sqrt{30}}{2(\sqrt{30} + \sqrt{5})} = \frac{\sqrt{30} \cdot (\sqrt{30} + \sqrt{5}) + \sqrt{30} \cdot (\sqrt{30} - \sqrt{5})}{2 \cdot (\sqrt{30} + \sqrt{5}) \cdot (\sqrt{30} - \sqrt{5})} = \frac{30 + \sqrt{30} \cdot \sqrt{5} + 30 - \sqrt{30} \cdot \sqrt{5}}{2 \cdot [(\sqrt{30})^2 - (\sqrt{5})^2]} = \frac{60}{2 \cdot (30 - 5)} = \frac{60}{50} = \frac{6}{5}$$

μ 3o

$$\text{) } A^2 + B^2 = |x+4|^2 + |x-4|^2 = (x+4)^2 + (x-4)^2 = x^2 + 8x + 16 + x^2 - 8x + 16 = 2x^2 + 32$$

$$\text{) } A + B = |x+4| + |x-4| = 8, \quad x+4 > 0 \quad x-4 < 0$$

$$\text{) } A^2 + B^2 \geq 16x \stackrel{a)}{\Leftrightarrow} 2x^2 + 32 \geq 16x \Leftrightarrow 2x^2 - 16x + 32 \geq 0 \Leftrightarrow 2(x^2 - 8x + 16) \geq 0 \Leftrightarrow 2(x-4)^2 \geq 0, \quad .$$

μ 1o.

i. $\frac{1}{x} + \frac{1}{x} = \frac{2}{x}$; (10 μ)

ii. $\frac{1}{x} - \frac{1}{x} = 0$; (10 μ)

iii. $|\alpha + \beta| \leq |\alpha| + |\beta|$. (10 μ)

μ 2o.

$$A = \sqrt{27} - \sqrt{11} \quad B = \sqrt{27} + \sqrt{11} .$$

i) $A^2 + B^2 = 76$ μ 10

ii) $\sqrt[3]{4} \cdot \sqrt[3]{A} \cdot \sqrt[3]{B} = 4$ μ 10

iii) $\frac{\sqrt{3}}{2A} + \frac{\sqrt{3}}{2B} = \frac{9}{16}$ μ 10

μ 3o.

$$= |x+5| \quad = |5-x| , x \in \mathbb{R} .$$

) $A^2 + B^2 = 2x^2 + 50$ μ 15

) $A + B = 10 \quad -5 < x < 5$ μ 15

) $A^2 + B^2 \geq 20x$ μ 10

μ 1o.

μ 2o.

$$\text{i) } A^2 + B^2 = (\sqrt{27} - \sqrt{11})^2 + (\sqrt{27} + \sqrt{11})^2 = \sqrt{27}^2 - 2 \cdot \sqrt{27} \cdot \sqrt{11} + \sqrt{11}^2 + \sqrt{27}^2 + 2 \cdot \sqrt{27} \cdot \sqrt{11} + \sqrt{11}^2 = 27 + 11 + 27 + 11 = 76$$

$$\text{ii) } \sqrt[3]{4} \cdot \sqrt[3]{A} \cdot \sqrt[3]{B} = \sqrt[3]{4} \cdot \sqrt[3]{\sqrt{27} - \sqrt{11}} \cdot \sqrt[3]{\sqrt{27} + \sqrt{11}} = \sqrt[3]{4 \cdot (\sqrt{27} - \sqrt{11}) \cdot (\sqrt{27} + \sqrt{11})} = \sqrt[3]{4 \cdot [(\sqrt{27})^2 - (\sqrt{11})^2]} = \sqrt[3]{4 \cdot (27 - 11)} = \sqrt[3]{4 \cdot 16} = \sqrt[3]{64} = 4$$

$$\text{iii) } \frac{\sqrt{3}}{2A} + \frac{\sqrt{3}}{2B} = \frac{\sqrt{3}}{2(\sqrt{27} - \sqrt{11})} + \frac{\sqrt{3}}{2(\sqrt{27} + \sqrt{11})} = \frac{\sqrt{3} \cdot (\sqrt{27} + \sqrt{11}) + \sqrt{3} \cdot (\sqrt{27} - \sqrt{11})}{2 \cdot (\sqrt{27} + \sqrt{11}) \cdot (\sqrt{27} - \sqrt{11})} = \frac{\sqrt{81} + \sqrt{3} \cdot \sqrt{11} + \sqrt{81} - \sqrt{3} \cdot \sqrt{11}}{2 \cdot [(\sqrt{27})^2 - (\sqrt{11})^2]} = \frac{9 + 9}{2 \cdot (27 - 11)} = \frac{18}{32} = \frac{9}{16}$$

μ 3o

$$\text{) } A^2 + B^2 = |x+5|^2 + |5-x|^2 = (x+5)^2 + (5-x)^2 = x^2 + 10x + 25 + x^2 - 10x + 25 = 2x^2 + 50$$

$$\text{) } A + B = |x+5| + |5-x| = \cancel{x} + 5 + 5 - \cancel{x} = 10, \quad x+5 > 0 \quad 5-x > 0$$

$$\text{) } A^2 + B^2 \geq 20x \stackrel{a)}{\Leftrightarrow} 2x^2 + 50 \geq 20x \Leftrightarrow 2x^2 - 20x + 50 \geq 0 \Leftrightarrow 2(x^2 - 10x + 25) \geq 0 \Leftrightarrow 2(x-5)^2 \geq 0, \quad .$$