

阶段拔尖专训1 与二次根式有关的 阅读理解题



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答案呈现

题型1 与二次根式的分母有理化有关

1.在数学课外学习活动中，小光和他的同学遇到一道题：

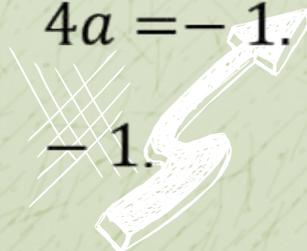
已知 $a = \frac{1}{2+\sqrt{3}}$ ，求 $2a^2 - 8a + 1$ 的值。

他是这样解答的： $\because a = \frac{1}{2+\sqrt{3}} = \frac{2-\sqrt{3}}{(2+\sqrt{3})(2-\sqrt{3})} = 2 - \sqrt{3}$ ，

$\therefore a - 2 = -\sqrt{3} \therefore (a - 2)^2 = 3$ ，即 $a^2 - 4a + 4 = 3 \therefore a^2 -$

$4a = -1 \therefore 2a^2 - 8a + 1 = 2(a^2 - 4a) + 1 = 2 \times (-1) + 1 =$

-1



请你根据小光的解题过程，解决如下问题：

$$(1) \frac{1}{\sqrt{2}+1} = \underline{\sqrt{2}-1};$$



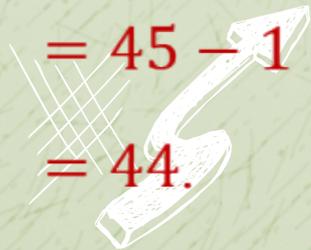
(2) 化简 $\frac{1}{\sqrt{2}+1} + \frac{1}{\sqrt{3}+\sqrt{2}} + \frac{1}{\sqrt{4}+\sqrt{3}} + \dots + \frac{1}{\sqrt{2025}+\sqrt{2024}}$;



$$\begin{aligned}
& \text{【解】 } \frac{1}{\sqrt{2}+1} + \frac{1}{\sqrt{3}+\sqrt{2}} + \frac{1}{\sqrt{4}+\sqrt{3}} + \cdots + \frac{1}{\sqrt{2025}+\sqrt{2024}} \\
&= \frac{\sqrt{2}-1}{(\sqrt{2}+1)(\sqrt{2}-1)} + \frac{\sqrt{3}-\sqrt{2}}{(\sqrt{3}+\sqrt{2})(\sqrt{3}-\sqrt{2})} + \frac{\sqrt{4}-\sqrt{3}}{(\sqrt{4}+\sqrt{3})(\sqrt{4}-\sqrt{3})} + \cdots + \\
&\quad \frac{\sqrt{2025}-\sqrt{2024}}{(\sqrt{2025}+\sqrt{2024})(\sqrt{2025}-\sqrt{2024})} \\
&= \sqrt{2} - 1 + \sqrt{3} - \sqrt{2} + \sqrt{4} - \sqrt{3} + \cdots + \sqrt{2025} - \sqrt{2024} \\
&= \sqrt{2025} - 1
\end{aligned}$$

$$= 45 - 1$$

$$= 44.$$



(3) 若 $a = \frac{1}{\sqrt{10}+3}$, 求 $a^4 + 6a^3 + 6a + 2025$ 的值.

$$\because a = \frac{1}{\sqrt{10}+3} = \frac{\sqrt{10}-3}{(\sqrt{10}+3)(\sqrt{10}-3)} = \sqrt{10} - 3,$$

$$\therefore a + 3 = \sqrt{10}.$$

$$\therefore (a + 3)^2 = 10, \text{ 即 } a^2 + 6a + 9 = 10.$$

$$\therefore a^2 + 6a = 1.$$

$$\therefore a^4 + 6a^3 + 6a + 2025 = a^2(a^2 + 6a) + 6a + 2025 = a^2 \times$$

$$1 + 6a + 2025 = a^2 + 6a + 2025 = 1 + 2025 = 2026.$$

题型2 与二次根式的性质有关

2.先阅读下列解答过程，然后再解答：

形如 $\sqrt{m \pm 2\sqrt{n}}$ 的化简，只要我们找到两个正数 a, b ，使

$$a + b = m, ab = n, \text{ 即 } (\sqrt{a})^2 + (\sqrt{b})^2 = m, \sqrt{a} \times \sqrt{b} = \sqrt{n},$$

$$\text{那么便有 } \sqrt{m \pm 2\sqrt{n}} = \sqrt{(\sqrt{a} \pm \sqrt{b})^2} = \sqrt{a} \pm \sqrt{b} (a > b).$$

例如：化简 $\sqrt{7 + 4\sqrt{3}}$.



解：把 $\sqrt{7 + 4\sqrt{3}}$ 化为 $\sqrt{7 + 2\sqrt{12}}$ ，这里 $m = 7$ ， $n = 12$ ，由

于 $4 + 3 = 7$ ， $4 \times 3 = 12$ ，即 $(\sqrt{4})^2 + (\sqrt{3})^2 = 7$ ，

$$\sqrt{4} \times \sqrt{3} = \sqrt{12},$$

$$\therefore \sqrt{7 + 4\sqrt{3}} = \sqrt{7 + 2\sqrt{12}} = \sqrt{(\sqrt{4} + \sqrt{3})^2} = 2 + \sqrt{3}.$$



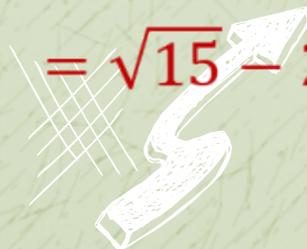
(1) 填空: $\sqrt{4 - 2\sqrt{3}} = \underline{\sqrt{3} - 1}$, $\sqrt{5 - 2\sqrt{6}} = \underline{\sqrt{3} - \sqrt{2}}$;

(2) 化简: $\sqrt{19 - 4\sqrt{15}}$ (请写出计算过程) ;

【解】原式 = $\sqrt{15 - 2\sqrt{60} + 4}$

= $\sqrt{(\sqrt{15} - 2)^2}$

= $\sqrt{15} - 2$.



(3) 化简: $\frac{1}{\sqrt{3+2\sqrt{2}}} + \frac{1}{\sqrt{5+2\sqrt{6}}} + \frac{1}{\sqrt{7+2\sqrt{12}}} + \frac{1}{\sqrt{9+2\sqrt{20}}} + \frac{1}{\sqrt{11+2\sqrt{30}}}$.

原式 = $\frac{1}{\sqrt{2+1}} + \frac{1}{\sqrt{3+\sqrt{2}}} + \frac{1}{2+\sqrt{3}} + \frac{1}{\sqrt{5+2}} + \frac{1}{\sqrt{6+\sqrt{5}}}$

= $\sqrt{2} - 1 + \sqrt{3} - \sqrt{2} + 2 - \sqrt{3} + \sqrt{5} - 2 + \sqrt{6} - \sqrt{5}$

= $\sqrt{6} - 1$.



以上内容仅为本文档的试下载部分，为可阅读页数的一半内容。如要下载或阅读全文，请访问：<https://d.book118.com/516232025055011003>