

**A sample set of the
fully worked handwritten
solutions for the homework
assignment on the topic of
Surds**

Homework

Topic: Surds

Skill: Rationalising a denominator without simplifying surds first

1. [MUST]

Similar to 1HR – June 2024 (Q17b – 3 marks)

Express $\frac{5}{2-\sqrt{3}}$ in the form $\sqrt{a} + b$ where a and b are integers.

$$\begin{aligned}
 & \frac{5}{2-\sqrt{3}} \\
 = & \frac{5}{2-\sqrt{3}} \times \frac{2+\sqrt{3}}{2+\sqrt{3}} \quad (M1) \\
 = & \frac{5(2+\sqrt{3})}{(2-\sqrt{3})(2+\sqrt{3})} \\
 = & \frac{10+5\sqrt{3}}{(2)^2 - (\sqrt{3})^2} \\
 = & \frac{10+5\sqrt{3}}{4-3} \\
 = & \frac{10+5\sqrt{3}}{1} \quad (M1) \\
 = & 10 + 5\sqrt{3} \\
 = & 10 + \sqrt{25} \cdot \sqrt{3} \quad 5 = \sqrt{25} \\
 = & 10 + \sqrt{75} \\
 = & \sqrt{75} + 10 \quad (A1) \quad \text{Answer has to be in the form of } \sqrt{a} + b !
 \end{aligned}$$

Homework

Topic: Surds

Skill: Rationalising a denominator by simplifying surds first

1. [MUST]

Similar to 2H – January 2023 (Q17 – 3 marks)

Show that $\frac{13 - \sqrt{8}}{1 - \sqrt{2}}$ can be written in the form $a + b\sqrt{2}$ where "a" and "b" are integers.

$$\begin{aligned}
 & \frac{13 - \sqrt{8}}{1 - \sqrt{2}} \\
 &= \frac{13 - \sqrt{4} \times \sqrt{2}}{1 - \sqrt{2}} \\
 &= \frac{13 - 2\sqrt{2}}{1 - \sqrt{2}} \\
 &= \frac{13 - 2\sqrt{2}}{1 - \sqrt{2}} \\
 &= \frac{13 - 2\sqrt{2}}{1 - \sqrt{2}} \times \frac{(1 + \sqrt{2})}{(1 + \sqrt{2})} \quad (M1) \\
 &= \frac{(13 - 2\sqrt{2})(1 + \sqrt{2})}{(1)^2 - (\sqrt{2})^2} \\
 &= \frac{13(1) + 13(\sqrt{2}) - 2\sqrt{2}(1) - 2\sqrt{2}(\sqrt{2})}{1 - 2} \\
 &= \frac{13 + 13\sqrt{2} - 2\sqrt{2} - 2(2)}{-1} \\
 &= \frac{13 + 11\sqrt{2} - 4}{-1} \\
 &= \frac{9 + 11\sqrt{2}}{-1} \quad (M1) \\
 &= -9 - 11\sqrt{2} \quad (A1) \text{ Answer has to be in the form of } a + b\sqrt{2} !
 \end{aligned}$$

Homework
Topic: Surds

2. [MUST]
2H - January 2022 (Q17 - 3 marks)

Show that $\frac{\sqrt{12}}{\sqrt{3}+2}$ can be written in the form $a + \sqrt{b}$ where a and b are integers.

$$\begin{aligned}
 & \frac{\sqrt{12}}{\sqrt{3}+2} \\
 &= \frac{\sqrt{4} \times \sqrt{3}}{\sqrt{3}+2} \\
 &= \frac{2 \times \sqrt{3}}{\sqrt{3}+2} \\
 &= \frac{2\sqrt{3}}{\sqrt{3}+2} \times \frac{(\sqrt{3}-2)}{(\sqrt{3}-2)} \quad (M1) \\
 &= \frac{2\sqrt{3}(\sqrt{3}-2)}{(\sqrt{3}+2)(\sqrt{3}-2)} \\
 &= \frac{2\sqrt{3}(\sqrt{3}) + 2\sqrt{3}(-2)}{(\sqrt{3})^2 - (2)^2} \\
 &= \frac{2(3) - 4\sqrt{3}}{3 - 4} \\
 &= \frac{6 - 4\sqrt{3}}{-1} \quad (M1) \\
 &= -6 + 4\sqrt{3} \quad 4 = \sqrt{16} \\
 &= -6 + \sqrt{16} \times \sqrt{3} \\
 &= -6 + \sqrt{48} \quad (A1) \text{ Answer has to be in the form of } a + \sqrt{b} !
 \end{aligned}$$

How my fully worked solutions are structured

Homework
Topic: Surds

Skill: Rationalising a denominator without simplifying surds first

1. [MUST]

Similar to 1HR – June 2024 (Q17b – 3 marks)

Express $\frac{5}{2-\sqrt{3}}$ in the form $\sqrt{a} + b$ where a and b are integers.

$$\begin{aligned}
 & \frac{5}{2-\sqrt{3}} \\
 = & \frac{5}{2-\sqrt{3}} \times \frac{2+\sqrt{3}}{2+\sqrt{3}} \quad (M1) \\
 = & \frac{5(2+\sqrt{3})}{(2-\sqrt{3})(2+\sqrt{3})} \\
 = & \frac{10+5\sqrt{3}}{(2)^2 - (\sqrt{3})^2} \\
 = & \frac{10+5\sqrt{3}}{4-3} \\
 = & \frac{10+5\sqrt{3}}{1} \quad (M1) \\
 = & 10 + 5\sqrt{3} \\
 = & 10 + \sqrt{25} \cdot \sqrt{3} \quad 5 = \sqrt{25} \\
 = & 10 + \sqrt{75} \\
 = & \sqrt{75} + 10 \quad (A1) \quad \text{Answer has to be in the form of } \sqrt{a} + b !
 \end{aligned}$$

My fully worked solutions present **each step of the working** clearly and indicate **how specific marks are allocated**, ensuring your child understands the method and knows how to secure every mark available.