Indices, Standard Form and Surds

Number · 6 questions · step-by-step answers at the end

Name: Date: Score: / 6

USEFUL EQUATIONS

$a^m \times a^n = a^{m+n}$, $a^m \div a^n = a^{m-n}$, $(a^m)^n = a^{mn}$ $a^{-n} = 1/a^n$, $a^{m/n} = (\sqrt[n]{a})^m$ $\sqrt{(ab)} = \sqrt{a} \times \sqrt{b}$

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

Questions

Show your working in the space under each question.

1. EASY Simplify $x^5 \times x^3 \div x^2$.

2. EASY Write 0.00047 in standard form.

3. MEDIUM Evaluate $16^{-3/4}$.

4. MEDIUM Simplify $\sqrt{50} + \sqrt{18}$.

5. HARD Work out $(6 \times 10^{8}) \div (1.5 \times 10^{-3})$ in standard form.

6. HARD Expand and simplify $(2 + \sqrt{5})(3 - \sqrt{5})$.

Step-by-step answers

Indices, Standard Form and Surds

1. Add then subtract the powers: $5 + 3 - 2 = 6$, so $\mathbf{x^6}$.
2. Move the decimal point 4 places: $\mathbf{4.7 \times 10^{-4}}$.
3. Fourth root of 16 is 2. Cube: 8. Negative power means reciprocal: **1/8**.
4. $\sqrt{50} = 5\sqrt{2}$ and $\sqrt{18} = 3\sqrt{2}$, so the sum is $\mathbf{8\sqrt{2}}$.
5. $6 \div 1.5 = 4$, and $10^8 \div 10^{-3} = 10^{11}$. Answer $\mathbf{4 \times 10^{11}}$.
6. $6 - 2\sqrt{5} + 3\sqrt{5} - 5 = \mathbf{1 + \sqrt{5}}$.