Surds Essential Practice

Skill: Rationalising the denominator

Questions

Attempt these questions independently showing full and clear solutions. Check each answer as you go.

1. Rationalise the denominator of the following fractions:

a) $\frac{1}{\sqrt{3}}$	b) $\frac{1}{\sqrt{5}}$
c) $\frac{1}{\sqrt{6}}$	d) $\frac{1}{\sqrt{8}}$
e) $\frac{6}{\sqrt{2}}$	f) $\frac{12}{\sqrt{3}}$
g) $\frac{10}{3\sqrt{2}}$	

- 2. Write the following in simplified surd form:
 - a) $\sqrt{45} + \frac{20}{\sqrt{5}}$ b) $5\sqrt{8} + \frac{6}{\sqrt{2}}$

c)
$$\frac{\sqrt{50} + \sqrt{18}}{\sqrt{8}}$$
 d) $\frac{\sqrt{63}}{3} + \frac{14}{\sqrt{7}}$

e)
$$\frac{\sqrt{75}-\sqrt{27}}{\sqrt{3}}$$

- 3. Write the following in the form $a + b\sqrt{c}$ where $a, b, c \in \mathbb{Z}$.
 - a) $\frac{1}{\sqrt{2}-1}$ b) $\frac{7+\sqrt{5}}{3+\sqrt{5}}$ c) $\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$
 - d) $\frac{\sqrt{2}+2}{3\sqrt{2}-4}$ e) $\frac{5+\sqrt{7}}{3-\sqrt{7}}$ f) $\frac{\sqrt{7}+1}{\sqrt{7}-2}$
- 4a. Express $\sqrt{45}$ in the form $n\sqrt{5}$ where $n \in \mathbb{N}$.
 - b. Hence solve the equation:

 $x\sqrt{20} = 7\sqrt{5} - \sqrt{45}$

giving your answer in simplified surd form.

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