

Surds and Indices

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1) Surds and Indices: Easier

1) Match each surd to its index form equivalent. One has been done for you.

$\sqrt{2}$	—————	$2^{-\frac{1}{2}}$
$\frac{1}{\sqrt{2}}$	—————	$2^{\frac{1}{2}}$
$2^2\sqrt{2}$	—————	$2^{\frac{5}{2}}$

$2\sqrt{2}$	—————	$2^{-\frac{3}{2}}$
$\frac{1}{\sqrt{8}}$	—————	$2^{\frac{3}{2}}$

(4 marks)

2) Write $\sqrt{3}$ in the form 3^n

$$3^{\frac{1}{2}}$$

..... $3^{\frac{1}{2}}$

(1 marks)

3) Write $\frac{1}{\sqrt{5}}$ in the form 5^n

$$5^{-\frac{1}{2}}$$

..... $5^{-\frac{1}{2}}$

(1 marks)

1) Surds and Indices: Medium

- 4) Show that $3^{\frac{3}{2}}$ can be written in the form $a\sqrt{3}$

$$3^{\frac{3}{2}} = (\sqrt{3})^3 = \sqrt{3} \times \sqrt{3} \times \sqrt{3} = 3\sqrt{3}$$

..... $3\sqrt{3}$

(2 marks)

- 5) Show that $8^{\frac{1}{2}}$ can be written in the form $a\sqrt{2}$

$$8^{\frac{1}{2}} = \sqrt{8} = 2\sqrt{2}$$

..... $2\sqrt{2}$

(2 marks)

- 6) Write $\frac{7}{\sqrt{7}}$ in the form 7^n

$$\frac{7}{\sqrt{7}} = \frac{7\sqrt{7}}{7} = \sqrt{7} = 7^{\frac{1}{2}}$$

..... $7^{\frac{1}{2}}$

(2 marks)

1) Surds and Indices: Harder

7) Show that $27^{-\frac{1}{2}}$ can be written in the form $\frac{\sqrt{3}}{a}$

$$27^{-\frac{1}{2}} = \frac{1}{\sqrt{27}} = \frac{1}{3\sqrt{3}} = \frac{\sqrt{3}}{3 \times 3} = \frac{\sqrt{3}}{9}$$

..... $\frac{\sqrt{3}}{9}$

(3 marks)

8) Show that $20^{-\frac{3}{2}}$ can be written in the form $\frac{\sqrt{5}}{a}$

$$20^{-\frac{3}{2}} = \frac{1}{(\sqrt{20})^3} = \frac{1}{20\sqrt{20}} = \frac{1}{20 \times 2 \times \sqrt{5}} = \frac{\sqrt{5}}{40 \times 5} = \frac{\sqrt{5}}{200}$$

..... $\frac{\sqrt{5}}{200}$

(4 marks)

9) Write $24\sqrt{3}$ in the form 12^n

$$24\sqrt{3} = 12 \times 2 \times \sqrt{3} = 12 \times \sqrt{4} \times \sqrt{3} = 12\sqrt{12} = 12^1 \times 12^{\frac{1}{2}} = 12^{\frac{3}{2}}$$

..... $12^{\frac{3}{2}}$

(4 marks)
