Sample Set 07

- What is a surd?

$\sqrt{c}+\sqrt{d}$ where c and d positive integers.

or $\sqrt{c}-\sqrt{d}$

$a+\sqrt{b}$ or $a-\sqrt{b}$

Eg: $\sqrt{2}-\sqrt{3}$, $5+\sqrt{7}$

} All these are called surds.

- What is a conjugate of a surd?

$\sqrt{c}-\sqrt{d}$ has conjugate $\sqrt{c}+\sqrt{d}$

$\sqrt{c}+\sqrt{d}$ conjugate $\sqrt{c}-\sqrt{d}$

Eg: $3+\sqrt{5}$, conjugate $= 3-\sqrt{5}$

$\sqrt{2}-\sqrt{7}$, conjugate $= \sqrt{2}+\sqrt{7}$.

- Remark: Important property

$(\sqrt{c}-\sqrt{d})(\sqrt{c}+\sqrt{d})$

$= (\sqrt{c})^2-(\sqrt{d})^2$

$= c-d$ ← no radicals.

Difference of sq.

A^2-B^2

$=(A-B)(A+B)$

We say that the surd is rationalized.

Sample Question Set 07

Q1.

$$\frac{6}{\sqrt{x+2}-\sqrt{x-2}} = \frac{6}{\sqrt{x+2}-\sqrt{x-2}} \cdot \underbrace{\frac{\sqrt{x+2}+\sqrt{x-2}}{\sqrt{x+2}+\sqrt{x-2}}}_{=1}$$

$$= \frac{6\left(\sqrt{x+2}+\sqrt{x-2}\right)}{(x+2)-(x-2)}$$

$$= \frac{6\left(\sqrt{x+2}+\sqrt{x-2}\right)}{\cancel{x}+2-\cancel{x}+2}$$

$$= \frac{\overset{3}{\cancel{6}}\left(\sqrt{x+2}+\sqrt{x-2}\right)}{\underset{2}{\cancel{4}}}$$

$$= \frac{3}{2}\left(\sqrt{x+2}+\sqrt{x-2}\right)$$

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Q2

$$\frac{x-4}{\sqrt{2x+1}-3} \cdot \overbrace{\frac{\sqrt{2x+1}+3}{\sqrt{2x+1}+3}}^{=1}$$

$$= \frac{(x-4)(\sqrt{2x+1}+3)}{(2x+1)-(3)^2}$$

$$= \frac{(x-4)(\sqrt{2x+1}+3)}{2x+1-9}$$

$$= \frac{(x-4)(\sqrt{2x+1}+3)}{2x-8}$$

$$= \frac{\cancel{(x-4)}(\sqrt{2x+1}+3)}{2\cancel{(x-4)}}$$

$$= \frac{1}{2}(\sqrt{2x+1}+3) \quad \#$$