Exercise 1E

Question 5:

If a and b are integers and x is a natural number, then $(a+b\sqrt{x})$ and $(a-b\sqrt{x})$ are rationalising factor of each other, as $(a+b\sqrt{x})(a-b\sqrt{x}) = (a^2 - b^2x)$, which is rational.

Therefore, we have,

$$\frac{1}{(5+3\sqrt{2})} = \frac{1}{5+3\sqrt{2}} \times \frac{5-3\sqrt{2}}{5-3\sqrt{2}}$$

$$= \frac{5-3\sqrt{2}}{(5)^2 - (3\sqrt{2})^2} = \frac{5-3\sqrt{2}}{25-18} = \left(\frac{5-3\sqrt{2}}{7}\right)$$

Question 6:

If a and b are integers, then $(\sqrt{a}+\sqrt{b})$ and $(\sqrt{a}-\sqrt{b})$ are rationalising factor of each other, as $(\sqrt{a}+\sqrt{b})(\sqrt{a}-\sqrt{b}) = (a-b)$, which is rational.

Therefore, we have,

$$\frac{1}{(\sqrt{6}-\sqrt{5})} = \frac{1}{\sqrt{6}-\sqrt{5}} \times \frac{\sqrt{6}+\sqrt{5}}{\sqrt{6}+\sqrt{5}} = \frac{\sqrt{6}+\sqrt{5}}{(\sqrt{6^2}) - (\sqrt{5})^2} = \frac{\sqrt{6}+\sqrt{5}}{6-5}$$

$$= \frac{\sqrt{6}+\sqrt{5}}{1} = (\sqrt{6}+\sqrt{5}).$$

Question 7:

If a and b are integers, then $(\sqrt{a}+\sqrt{b})$ and $(\sqrt{a}-\sqrt{b})$ are rationalising factor of each other, as $(\sqrt{a}+\sqrt{b})(\sqrt{a}-\sqrt{b}) = (a-b)$, which is rational.

Therefore, we have,

$$\frac{4}{(\sqrt{7}+\sqrt{3})} = \frac{4}{\sqrt{7}+\sqrt{3}} \times \frac{\sqrt{7}-\sqrt{3}}{\sqrt{7}-\sqrt{3}} = \frac{4(\sqrt{7}-\sqrt{3})}{(\sqrt{7})^2 - (\sqrt{3})^2}$$

$$= \frac{4(\sqrt{7}-\sqrt{3})}{7-3} = \frac{4(\sqrt{7}-\sqrt{3})}{4}$$

$$= (\sqrt{7}-\sqrt{3}).$$

********** END **********