Exercise 1D

Question 3:

(i) $16\sqrt{6}$ by $4\sqrt{2}$

$$16\sqrt{6} \div 4\sqrt{2} = \frac{16\sqrt{6}}{4\sqrt{2}} = \frac{4\sqrt{6}}{\sqrt{2}} = \frac{4\sqrt{6} \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}}$$
$$= \frac{4\sqrt{6 \times 2}}{2} = \frac{4\sqrt{2 \times 3 \times 2}}{2}$$
$$= \frac{4 \times 2\sqrt{3}}{2} = 4\sqrt{3}$$

(ii) $12\sqrt{15}$ by $4\sqrt{3}$

$$12\sqrt{15} \div 4\sqrt{3} = \frac{12\sqrt{15}}{4\sqrt{3}} = \frac{3\sqrt{15}}{\sqrt{3}} = \frac{3\sqrt{15} \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}}$$
$$= \frac{3\sqrt{15 \times 3}}{3} = \sqrt{3 \times 5 \times 3} = 3\sqrt{5}$$

(iii) $18\sqrt{21}$ by $6\sqrt{7}$

$$18\sqrt{21} \div 6\sqrt{7} = \frac{18\sqrt{21}}{6\sqrt{7}} = \frac{3\sqrt{21}}{\sqrt{7}} = \frac{3\sqrt{21} \times \sqrt{7}}{\sqrt{7} \times \sqrt{7}}$$
$$= \frac{3\sqrt{3 \times 7 \times 7}}{7} = \frac{3 \times 7\sqrt{3}}{7} = 3\sqrt{3}$$

Question 4:

(i) $(4 + \sqrt{2})(4 - \sqrt{2})$

$= (4)^2 - (\sqrt{2})^2$ $\quad [\because a^2 - b^2 = (a - b)(a + b)]$
$= 16 - 2 = 14$

(ii) $(\sqrt{5} + \sqrt{3})(\sqrt{5} - \sqrt{3})$

$(\sqrt{5})^2 - (\sqrt{3})^2$ $\quad [\because a^2 - b^2 = (a - b)(a + b)]$
$= 5 - 3 = 2.$

(iii) $(6 - \sqrt{6}) + (6 + \sqrt{6})$

$= (6)^2 - (\sqrt{6})^2$ $\quad [\because a^2 - b^2 = (a - b)(a + b)]$
$= 36 - 6 = 30.$

(iv) $(\sqrt{5} - \sqrt{2})(\sqrt{2} - \sqrt{3})$

$= \sqrt{5}(\sqrt{2} - \sqrt{3}) - \sqrt{2}(\sqrt{2} - \sqrt{3})$
$= (\sqrt{10} - \sqrt{15} - 2 + \sqrt{6}).$

(v) $(\sqrt{5} - \sqrt{3})^2$

$= (\sqrt{5})^2 + (\sqrt{3})^2 - 2\sqrt{5}.\sqrt{3}$
$= 5 + 3 - 2\sqrt{15}$
$= 8 - 2\sqrt{15}$

(vi) $(3 - \sqrt{3})^2$

$= (3)^2 + (\sqrt{3})^2 - 2.3.\sqrt{3}$
$= 9 + 3 - 6\sqrt{3}$
$= 12 - 6\sqrt{3}$

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