More Simplifying Surds

(a)

Show that $\sqrt{54} = 3\sqrt{6}$

$$\sqrt{54} = \sqrt{9} \times \sqrt{6}$$
$$= 3 \times \sqrt{6}$$
$$= 3\sqrt{6}$$

(b)

Show that $\sqrt{75} = 5\sqrt{3}$

$$\sqrt{75} = \sqrt{25} \times \sqrt{3}$$
$$= 5 \times \sqrt{3}$$
$$= 5\sqrt{3}$$

(c)

Show that $\sqrt{160}$ can be written as $k\sqrt{10}$ where k is to be found

$$\sqrt{160} = \sqrt{16} \times \sqrt{10}$$
$$= 4\sqrt{10}$$
$$k = 4$$

(d)

Show that $\sqrt{98}$ can be written as $k\sqrt{2}$ where k is to be found

$$\sqrt{98} = \sqrt{49} \times \sqrt{2}$$
$$= 7\sqrt{2}$$
$$k = 7$$

(e)

Write $5\sqrt{8}$ in the form $k\sqrt{2}$, where k is an integer to be found

$$5\sqrt{8} = 5 \times \sqrt{4} \times \sqrt{2}$$
$$= 5 \times 2 \times \sqrt{2}$$
$$= 10\sqrt{2}$$
$$k = 10$$

(f)

Simplify $3\sqrt{20}$

$$3\sqrt{20} = 3 \times \sqrt{4} \times \sqrt{5}$$
$$= 3 \times 2 \times \sqrt{5}$$
$$= 6\sqrt{5}$$

(g)

Simplify $8\sqrt{12}$

$$8\sqrt{12} = 8 \times \sqrt{4} \times \sqrt{3}$$
$$= 8 \times 2 \times \sqrt{3}$$
$$= 16\sqrt{3}$$

(h)

Write $10\sqrt{24}$ in the form $k\sqrt{6}$, where k is an integer to be found

$$10\sqrt{24} = 10 \times \sqrt{4} \times \sqrt{6}$$
$$= 10 \times 2 \times \sqrt{6}$$
$$= 20\sqrt{6}$$
$$k = 20$$

(i)

Write $\sqrt{8} \times 2\sqrt{5}$ in the form $k\sqrt{10}$ where k is an integer to be found

$$\sqrt{8} \times 2\sqrt{5} = \sqrt{4} \times \sqrt{2} \times 2\sqrt{5}$$
$$= 2 \times \sqrt{2} \times 2 \times \sqrt{5}$$
$$= 4\sqrt{10}$$
$$k = 4$$

(j)

Write $\sqrt{15} \times \sqrt{5}$ in the form $k\sqrt{3}$ where k is an integer to be found

$$\sqrt{15} \times \sqrt{5} = \sqrt{75}$$
$$= \sqrt{25} \times \sqrt{3}$$
$$= 5\sqrt{3}$$
$$k = 5$$

(k)

Write $\frac{\sqrt{200}}{\sqrt{5}}$ as a fully simplified surd

$$\sqrt{200} \div \sqrt{5} = \sqrt{40}$$
$$= \sqrt{4} \times \sqrt{10}$$
$$= 2\sqrt{10}$$

(l)

Write $\frac{\sqrt{12a} \times \sqrt{5a}}{\sqrt{10}}$ in its simplest form

$$\frac{\sqrt{12a} \times \sqrt{5a}}{\sqrt{10}} = \frac{\sqrt{12} \times \sqrt{a} \times \sqrt{5} \times \sqrt{a}}{\sqrt{10}}$$
$$= \frac{\sqrt{60} \times a}{\sqrt{10}}$$
$$= a\sqrt{6}$$