Expanding Brackets with Surds (1)

1 By expanding brackets first, write each of the following calculations in its simplest form.

Example

$3(\sqrt{2}+4)$

X	$\sqrt{2}$	+ 4
3	$3\sqrt{2}$	+ 12

Use a multiplication grid and apply the laws of surds.

$= 3\sqrt{2} + 12$

a) $3(\sqrt{2}+5)$ b) $4(\sqrt{2}+5)$ c) $4(\sqrt{3}+5)$ d) $8(\sqrt{3}+5)$

e) $8(\sqrt{3}+10)$ f) $4(2\sqrt{3}+5)$ g) $4(5+2\sqrt{3})$ h) $2(10+2\sqrt{3})$

i) $2(\sqrt{100}+2\sqrt{3})$ j) $2(\sqrt{16}+2\sqrt{3})$ k) $2(\sqrt{10}+2\sqrt{3})$ l) $2(\sqrt{12}+2\sqrt{3})$

2 By expanding brackets first, write each of the following calculations in its simplest form.

Example

$\sqrt{6}(\sqrt{2}+3)$

X	$\sqrt{2}$	$+3$
$\sqrt{6}$	$\sqrt{12}$	$+3\sqrt{6}$

$= \sqrt{12} + 3\sqrt{6}$

$= \mathbf{2\sqrt{3} + 3\sqrt{6}}$

Use a multiplication grid and apply the laws of surds.

Make sure your final answer is in its simplest form.

a) $\sqrt{7}(\sqrt{2}+3)$ b) $\sqrt{7}(\sqrt{2}+4)$ c) $\sqrt{7}(\sqrt{2}+5)$ d) $\sqrt{6}(\sqrt{2}+5)$

e) $\sqrt{10}(\sqrt{2}+5)$ f) $\sqrt{8}(\sqrt{2}+5)$ g) $\sqrt{8}(\sqrt{5}+5)$ h) $2\sqrt{2}(\sqrt{5}+5)$

i) $3\sqrt{2}(\sqrt{5}+5)$ j) $3\sqrt{2}(\sqrt{2}+5)$ k) $3\sqrt{2}(\sqrt{8}+5)$ l) $3\sqrt{2}(\sqrt{8}+\sqrt{2})$

ANSWERS

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1 By expanding brackets first, write each of the following calculations in its simplest form.

Example

$3(\sqrt{2}+4)$

×	$\sqrt{2}$	+4
3	$3\sqrt{2}$	+12

Use a multiplication grid and apply the laws of surds.

$= 3\sqrt{2}+12$

a) $3(\sqrt{2}+5)$ $= 3\sqrt{2}+15$

b) $4(\sqrt{2}+5)$ $= 4\sqrt{2}+20$

c) $4(\sqrt{3}+5)$ $= 4\sqrt{3}+20$

d) $8(\sqrt{3}+5)$ $= 8\sqrt{3}+40$

e) $8(\sqrt{3}+10)$ $= 8\sqrt{3}+80$

f) $4(2\sqrt{3}+5)$ $= 8\sqrt{3}+20$

g) $4(5+2\sqrt{3})$ $= 20+8\sqrt{3}$

h) $2(10+2\sqrt{3})$ $= 20+4\sqrt{3}$

i) $2(\sqrt{100}+2\sqrt{3})$ $= 20+4\sqrt{3}$

j) $2(\sqrt{16}+2\sqrt{3})$ $= 8+4\sqrt{3}$

k) $2(\sqrt{10}+2\sqrt{3})$ $= 2\sqrt{10}+4\sqrt{3}$

l) $2(\sqrt{12}+2\sqrt{3})$ $= 2\sqrt{12}+4\sqrt{3}$
$= 4\sqrt{3}+4\sqrt{3}$
$= 8\sqrt{3}$

2 By expanding brackets first, write each of the following calculations in its simplest form.

Example

$\sqrt{6}(\sqrt{2}+3)$

×	$\sqrt{2}$	+3
$\sqrt{6}$	$\sqrt{12}$	$+3\sqrt{6}$

Use a multiplication grid and apply the laws of surds.

Make sure your final answer is in its simplest form.

$= \sqrt{12}+3\sqrt{6}$
$= 2\sqrt{3}+3\sqrt{6}$

a) $\sqrt{7}(\sqrt{2}+3)$ $= \sqrt{14}+3\sqrt{7}$

b) $\sqrt{7}(\sqrt{2}+4)$ $= \sqrt{14}+4\sqrt{7}$

c) $\sqrt{7}(\sqrt{2}+5)$ $= \sqrt{14}+5\sqrt{7}$

d) $\sqrt{6}(\sqrt{2}+5)$ $= \sqrt{12}+5\sqrt{6}$
$= 2\sqrt{3}+5\sqrt{6}$

e) $\sqrt{10}(\sqrt{2}+5)$ $= \sqrt{20}+5\sqrt{10}$
$= 2\sqrt{5}+5\sqrt{10}$

f) $\sqrt{8}(\sqrt{2}+5)$ $= \sqrt{16}+5\sqrt{8}$
$= 4+10\sqrt{2}$

g) $\sqrt{8}(\sqrt{5}+5)$ $= \sqrt{40}+5\sqrt{8}$
$= 2\sqrt{10}+10\sqrt{2}$

h) $2\sqrt{2}(\sqrt{5}+5)$ $= 2\sqrt{10}+10\sqrt{2}$

i) $3\sqrt{2}(\sqrt{5}+5)$ $= 3\sqrt{10}+15\sqrt{2}$

j) $3\sqrt{2}(\sqrt{2}+5)$ $= 6+15\sqrt{2}$

k) $3\sqrt{2}(\sqrt{8}+5)$ $= 3\sqrt{16}+15\sqrt{2}$
$= 12+15\sqrt{2}$

l) $3\sqrt{2}(\sqrt{8}+\sqrt{2})$ $= 12+6$
$= 18.$