

Brackets with surds

Multiply and simplify,

1) $(3\sqrt{2} + 2\sqrt{3})(4\sqrt{6} + 2\sqrt{3})$

2) $(4 + 3\sqrt{5})(3\sqrt{3} + 2)$

3) $(3\sqrt{6} + 4\sqrt{3})(3\sqrt{7} + 4\sqrt{6})$

4) $(5\sqrt{7} + 3)(3\sqrt{6} + 3)$

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

6) $(3 + 5\sqrt{3})(4\sqrt{3} + 4)$

7) $(2\sqrt{3} + 2\sqrt{2})(5\sqrt{6} + 5\sqrt{6})$

8) $(3\sqrt{5} + 5)(5 + 3\sqrt{3})$

9) $(4\sqrt{2} + 3\sqrt{6})(2\sqrt{6} + 3\sqrt{2})$

10) $(5\sqrt{6} + 2\sqrt{2})(3\sqrt{3} + 5\sqrt{3})$

11) $(2 + 3\sqrt{2})(2\sqrt{5} + 5)$

12) $(4\sqrt{6} + 3\sqrt{2})(3\sqrt{5} + 3\sqrt{7})$

13) $(3\sqrt{6} + 2)(5\sqrt{7} + 5)$

14) $(4\sqrt{3} + 3\sqrt{2})(5\sqrt{7} + 2\sqrt{2})$

15) $(4\sqrt{3} + 3)(4 + 4\sqrt{6})$

Brackets with surds

- 1) $(3\sqrt{2} + 2\sqrt{3})(4\sqrt{6} + 2\sqrt{3}) = 8\sqrt{18} + 12\sqrt{12} + 4\sqrt{9} + 6\sqrt{6}$
 $= 24\sqrt{2} + 24\sqrt{3} + 12 + 6\sqrt{6}$
- 2) $(4 + 3\sqrt{5})(3\sqrt{3} + 2) = 8 + 6\sqrt{5} + 12\sqrt{3} + 9\sqrt{15}$
 $= 8 + 6\sqrt{5} + 12\sqrt{3} + 9\sqrt{15}$
- 3) $(3\sqrt{6} + 4\sqrt{3})(3\sqrt{7} + 4\sqrt{6}) = 16\sqrt{18} + 12\sqrt{36} + 12\sqrt{21} + 9\sqrt{42}$
 $= 48\sqrt{2} + 72 + 12\sqrt{21} + 9\sqrt{42}$
- 4) $(5\sqrt{7} + 3)(3\sqrt{6} + 3) = 9 + 15\sqrt{7} + 9\sqrt{6} + 15\sqrt{42}$
 $= 9 + 15\sqrt{7} + 9\sqrt{6} + 15\sqrt{42}$
- 5) $(3\sqrt{5} + 5\sqrt{2})(2\sqrt{2} + 2\sqrt{6}) = 6\sqrt{10} + 10\sqrt{4} + 6\sqrt{30} + 10\sqrt{12}$
 $= 6\sqrt{10} + 20 + 6\sqrt{30} + 20\sqrt{3}$
- 6) $(3 + 5\sqrt{3})(4\sqrt{3} + 4) = 12 + 20\sqrt{3} + 12\sqrt{3} + 20\sqrt{9}$
 $= 72 + 32\sqrt{3}$
- 7) $(2\sqrt{3} + 2\sqrt{2})(5\sqrt{6} + 5\sqrt{6}) = 10\sqrt{18} + 10\sqrt{12} + 10\sqrt{18} + 10\sqrt{12}$
 $= 60\sqrt{2} + 40\sqrt{3}$
- 8) $(3\sqrt{5} + 5)(5 + 3\sqrt{3}) = 25 + 15\sqrt{5} + 15\sqrt{3} + 9\sqrt{15}$
 $= 25 + 15\sqrt{5} + 15\sqrt{3} + 9\sqrt{15}$
- 9) $(4\sqrt{2} + 3\sqrt{6})(2\sqrt{6} + 3\sqrt{2}) = 9\sqrt{12} + 12\sqrt{4} + 6\sqrt{36} + 8\sqrt{12}$
 $= 34\sqrt{3} + 60$
- 10) $(5\sqrt{6} + 2\sqrt{2})(3\sqrt{3} + 5\sqrt{3}) = 25\sqrt{18} + 10\sqrt{6} + 15\sqrt{18} + 6\sqrt{6}$
 $= 120\sqrt{2} + 16\sqrt{6}$
- 11) $(2 + 3\sqrt{2})(2\sqrt{5} + 5) = 10 + 15\sqrt{2} + 4\sqrt{5} + 6\sqrt{10}$
 $= 10 + 15\sqrt{2} + 4\sqrt{5} + 6\sqrt{10}$
- 12) $(4\sqrt{6} + 3\sqrt{2})(3\sqrt{5} + 3\sqrt{7}) = 9\sqrt{14} + 12\sqrt{42} + 9\sqrt{10} + 12\sqrt{30}$
 $= 9\sqrt{14} + 12\sqrt{42} + 9\sqrt{10} + 12\sqrt{30}$
- 13) $(3\sqrt{6} + 2)(5\sqrt{7} + 5) = 10 + 15\sqrt{6} + 10\sqrt{7} + 15\sqrt{42}$
 $= 10 + 15\sqrt{6} + 10\sqrt{7} + 15\sqrt{42}$
- 14) $(4\sqrt{3} + 3\sqrt{2})(5\sqrt{7} + 2\sqrt{2}) = 6\sqrt{4} + 8\sqrt{6} + 15\sqrt{14} + 20\sqrt{21}$
 $= 12 + 8\sqrt{6} + 15\sqrt{14} + 20\sqrt{21}$
- 15) $(4\sqrt{3} + 3)(4 + 4\sqrt{6}) = 12 + 16\sqrt{3} + 12\sqrt{6} + 16\sqrt{18}$
 $= 12 + 16\sqrt{3} + 12\sqrt{6} + 48\sqrt{2}$