

6:10 | Binomial Products—Surds

Name: _____

Class: _____

Examples

Expand and simplify.

$$1 \quad \sqrt{2}(\sqrt{3} - 2)$$

$$= \sqrt{6} - 2\sqrt{2}$$

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

$$= 6 + \sqrt{18}$$

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

$$3 \quad (2\sqrt{5} - \sqrt{3})(2\sqrt{5} + \sqrt{3})$$

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

$$= 20 - 3$$

$$= 17$$

$$4 \quad (\sqrt{5} + 7)(\sqrt{5} - 4)$$

$$= \sqrt{5}(\sqrt{5} - 4) + 7(\sqrt{5} - 4)$$

$$= 5 - 4\sqrt{5} + 7\sqrt{5} - 28$$

$$= 3\sqrt{5} - 23$$

$$5 \quad (4 - \sqrt{3})^2$$

$$= 4^2 - 2 \times 4 \times \sqrt{3} + \sqrt{3}^2$$

$$= 16 - 8\sqrt{3} + 3$$

$$= 19 - 8\sqrt{3}$$

Exercise

1 Expand and simplify.

a $\sqrt{5}(\sqrt{5} - 2)$

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

c $\sqrt{10}(3 + \sqrt{2})$

d $\sqrt{7}(3 + \sqrt{7})$

e $\sqrt{3}(\sqrt{3} + \sqrt{7})$

f $\sqrt{2}(5 - \sqrt{2})$

g $\sqrt{6}(\sqrt{2} - \sqrt{6})$

h $\sqrt{3}(\sqrt{2} - 4)$

i $\sqrt{7}(\sqrt{7} + \sqrt{3})$

2 Expand and simplify.

a $(x + 2)(x + 3)$

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

c $(\sqrt{6} + 2)(\sqrt{6} - 2)$

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

e $(\sqrt{3} - 1)(\sqrt{3} + 2)$

f $(5 + \sqrt{6})(5 - \sqrt{6})$

g $(\sqrt{6} - 1)(\sqrt{6} - 3)$

h $(2\sqrt{3} - 3)(2\sqrt{3} + 3)$

i $(4 - \sqrt{7})(2 + \sqrt{7})$

j $(1 + \sqrt{5})(4 + \sqrt{5})$

k $(\sqrt{7} + \sqrt{6})(\sqrt{7} - \sqrt{6})$

l $(\sqrt{10} - 5)(\sqrt{10} - 6)$

m $(3\sqrt{2} - 2)(3\sqrt{2} + 2)$

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

o $(3 - \sqrt{2})(7 + \sqrt{2})$

3 Expand and simplify.

a $(x + 2)^2$

b $(\sqrt{3} + 2)^2$

c $(4 - \sqrt{2})^2$

d $(\sqrt{5} - 4)^2$

e $(\sqrt{5} + \sqrt{3})^2$

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

g $(3 + \sqrt{7})^2$

h $(5 + \sqrt{11})^2$

i $(\sqrt{6} - 2)^2$

j $(\sqrt{13} - \sqrt{3})^2$

k $(\sqrt{10} + 5)^2$

l $(\sqrt{2} + 5)^2$

6:10 Binomial Products—Surds

- | | | | | | | | | | | | |
|-----|------------------|---|-------------------------|---|--------------------------|---|-------------------|---|--------------------|---|--------------------|
| 1 a | $5 - 2\sqrt{5}$ | b | $\sqrt{10} + \sqrt{15}$ | c | $3\sqrt{10} + 2\sqrt{5}$ | d | $3\sqrt{7} + 7$ | e | $3 + \sqrt{21}$ | f | $5\sqrt{2} - 2$ |
| g | $2\sqrt{3} - 6$ | h | $\sqrt{6} - 4\sqrt{3}$ | i | $7 + \sqrt{21}$ | | | | | | |
| 2 a | $x^2 + 5x + 6$ | b | $11 + 5\sqrt{5}$ | c | 2 | d | $17 + 8\sqrt{2}$ | e | $1 + \sqrt{3}$ | f | 19 |
| g | $10 - 4\sqrt{6}$ | h | 3 | i | $1 + 2\sqrt{7}$ | j | $9 + 5\sqrt{5}$ | k | 1 | l | $40 - 11\sqrt{10}$ |
| m | 14 | n | $21 + 7\sqrt{11}$ | o | $19 - 4\sqrt{2}$ | | | | | | |
| 3 a | $x^2 + 4x + 4$ | b | $7 + 4\sqrt{3}$ | c | $18 - 8\sqrt{2}$ | d | $21 - 8\sqrt{5}$ | e | $8 + 2\sqrt{15}$ | f | $5 - 2\sqrt{6}$ |
| g | $16 + 6\sqrt{7}$ | h | $36 + 10\sqrt{11}$ | i | $10 - 4\sqrt{6}$ | j | $16 - 2\sqrt{39}$ | k | $35 + 10\sqrt{10}$ | l | $27 + 10\sqrt{2}$ |