

EXPANSION

Involving Indices & Surds

1 Expand and simplify:

a $x^2(x^3 + 2x^2 + 1)$

b $2^x(2^x + 1)$

c $x^{\frac{1}{2}}(x^{\frac{1}{2}} + x^{-\frac{1}{2}})$

d $e^x(e^x + 2)$

e $3^x(2 - 3^{-x})$

f $x^{\frac{1}{2}}(x^{\frac{3}{2}} + 2x^{\frac{1}{2}} + 3x^{-\frac{1}{2}})$

g $2^{-x}(2^x + 5)$

h $5^{-x}(5^{2x} + 5^x)$

i $x^{-\frac{1}{2}}(x^2 + x + x^{\frac{1}{2}})$

2 Expand and simplify:

a $(2^x + 1)(2^x + 3)$

b $(3^x + 2)(3^x + 5)$

c $(5^x - 2)(5^x - 4)$

d $(2^x + 3)^2$

e $(3^x - 1)^2$

f $(4^x + 7)^2$

g $(x^{\frac{1}{2}} + 2)(x^{\frac{1}{2}} - 2)$

h $(2^x + 3)(2^x - 3)$

i $(x^{\frac{1}{2}} + x^{-\frac{1}{2}})(x^{\frac{1}{2}} - x^{-\frac{1}{2}})$

j $(x + \frac{2}{x})^2$

k $(e^x - e^{-x})^2$

l $(5 - 2^{-x})^2$

3 Simplify:

(a) $\sqrt{2}(3 - \sqrt{2})$

(b) $\sqrt{2}(3 - 2\sqrt{2})$

(c) $\sqrt{3}(\sqrt{27} - 1)$

(d) $(\sqrt{2} - 1)(\sqrt{2} + 1)$

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

(f) $(2\sqrt{2} + 1)(\sqrt{2} - 2)$

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

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

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

(j) $(2\sqrt{6} - 3)^2$