

1. (a)  $2^3 = 8$   
(b)  $3^4 = 81$   
(c)  $4^3 = 64$   
(d)  $10^5 = 100000$   
(e)  $5^4 = 625$   
(f)  $9^3 = 729$   
(g)  $19^2 = 361$   
(h)  $2^8 = 256$
2. (a)  $2^{3^2} = 512$   
(b)  $(2^3)^2 = 64$   
(c)  $3^{2^2} = 81$   
(d)  $(3^2)^2 = 81$
3. (a)  $4^2 \cdot 4^3 = 4^{2+3} = 4^5$   
(b)  $10^5 \cdot 10^8 = 10^{5+8} = 10^{13}$   
(c)  $5^4 \cdot 5 \cdot 5^5 = 5^{4+1+5} = 5^{10}$   
(d)  $2^4 \cdot 2^3 \cdot 2 \cdot 2^7 = 2^{4+3+1+7} = 2^{15}$   
(e)  $7^3 \cdot 7^5 \cdot 7^2 \cdot 7^9 = 7^{3+5+2+9} = 7^{19}$

4. (a)  $6^7 : 6^3 = 6^{7-3} = 6^4$   
(b)  $2^{12} : 2^5 = 2^{12-5} = 2^7$   
(c)  $8^9 : 8 = 8^{9-1} = 8^8$   
(d)  $4^8 : 4^6 \cdot 4^3 = 4^{8-6+3} = 4^5$   
(e)  $3^{19} \cdot 3^5 : 3 = 3^{19+5-1} = 3^{23}$   
(f)  $5^6 \cdot 5^7 : 5^9 \cdot 5 = 5^{6+7-9+1} = 5^5$
5. (a)  $3^2 + 3^2 = 18$   
(b)  $4^3 + 4^3 + 4^3 = 192$   
(c)  $2 \cdot 3^2 + 3^2 = 27$   
(d)  $9 - 2^3 = 1$   
(e)  $3^3 - 3^2 = 18$   
(f)  $10 + 5^2 = 35$   
(g)  $100 : 5^2 = 4$   
(h)  $3 \cdot 4^3 + 4^3 = 256$   
(i)  $4 \cdot 4^3 - 4^3 = 192$   
(j)  $3 \cdot 3 + 3^4 = 90$   
(k)  $4 \cdot 2^4 + 2 \cdot 4^2 = 96$   
(l)  $2^4 \cdot 5^4 = 10000$   
(m)  $(9 - 5)^3 = 64$   
(n)  $4^2 \cdot (2 \cdot 2^3) = 256$   
(o)  $4^2 - (2 \cdot 2)^3 = -48$   
(p)  $4^2 : (2 \cdot 2^3) = 1$   
(q)  $4^2 : (2 \cdot 2)^3 = 0.25$