Section 2: Indices

Solutions to Exercise level 1

1. (i) $3^4 = 3\times3\times3\times3 = 81$

(ii) $2^6 = 2\times2\times2\times2\times2\times2 = 64$

(iii) $4^{1/2} = \sqrt{4} = 2$

(iv) $6^0 = 1$

(v) $5^{-2} = \frac{1}{5^2} = \frac{1}{25}$

(vi) $64^{1/3} = \sqrt[3]{64} = 4$

(vii) $16^{-1/2} = \frac{1}{\sqrt{16}} = \frac{1}{4}$

(viii) $8^{5/3} = \left(\sqrt[3]{8}\right)^5 = 2^5 = 32$

(ix) $36^{-3/2} = \frac{1}{\left(\sqrt{36}\right)^3} = \frac{1}{6^3} = \frac{1}{216}$

(x) $\left(\frac{1}{2}\right)^{-1} = \left(2^{-1}\right)^{-1} = 2^1 = 2$

(xi) $\left(\frac{25}{9}\right)^{-1/2} = \left(\frac{9}{25}\right)^{1/2} = \sqrt{\frac{9}{25}} = \frac{3}{5}$

(xii) $\left(\frac{27}{64}\right)^{-2/3} = \left(\frac{64}{27}\right)^{2/3} = \left(\sqrt[3]{\frac{64}{27}}\right)^2 = \left(\frac{4}{3}\right)^2 = \frac{16}{9}$

2. (i) $3^{11}\times3^{-4}\div3^3 = 3^{11-4-3} = 3^4 = 81$

(ii) $\left(2^5\right)^3\times\left(2^7\right)^{-2} = 2^{15}\times2^{-14} = 2^{15-14} = 2^1 = 2$

(iii) $\frac{5^6}{5^5\times5^3} = 5^{6-5-3} = 5^{-2} = \frac{1}{5^2} = \frac{1}{25}$

3. (i) $2^3\times16^{\frac{1}{2}} = 2^3\times\left(2^4\right)^{\frac{1}{2}}$

$= 2^3\times2^2$

$= 2^5 \ (=32)$

(ii) $\frac{3^5\times5^3}{\sqrt{81\times25}} = \frac{3^5\times5^3}{\sqrt{3^4\times5^2}}$

$= \frac{3^5\times5^3}{3^2\times5}$

$= 3^3\times5^2 \ (=675)$

