C1 Indices and Surds

1. June 2010 qu. 1

   (i) Evaluate 9^0. [1]

   (ii) Express $9^{-\frac{1}{2}}$ as a fraction. [2]

2. June 2010 qu. 3

   (i) Express $\dfrac{12}{3+\sqrt{5}}$ in the form $a - b\sqrt{5}$, where a and b are positive integers. [3]

   (ii) Express $\sqrt{18} - \sqrt{2}$ in simplified surd form. [2]

3. Jan 2010 qu. 4

   Solve the equations

   (i) $3^m = 81$, [1]

   (ii) $(36p^4)^{\frac{1}{2}} = 24$, [3]

   (iii) $5^n \times 5^{n+4} = 25$. [3]

4. June 2009 qu. 2

   Express $\dfrac{8+\sqrt{7}}{2+\sqrt{7}}$ in the form $a + b\sqrt{7}$, where a and b are integers. [4]

5. June 2009 qu. 3

   Express each of the following in the form 3^n:

   (i) $\dfrac{1}{9}$, [1]   (ii) $\sqrt[3]{3}$, [1]   (iii) $3^{10} \times 9^{15}$. [2]

6. Jan 2009 qu. 1

   Express $\sqrt{45} + \dfrac{20}{\sqrt{5}}$ in the form $k\sqrt{5}$, where k is an integer. [3]

7. Jan 2009 qu. 2

   Simplify

   (i) $(\sqrt[3]{6})^6$, [1]

   (ii) $\dfrac{3y^4 \times (10y)^3}{2y^5}$. [3]

8. June 2008 qu. 3

   Express each of the following in the form $k\sqrt{2}$, where k is an integer:

   (i) $\sqrt{200}$, [1]

   (ii) $\dfrac{12}{\sqrt{2}}$, [1]

   (iii) $5\sqrt{8} - 3\sqrt{2}$. [2]

9. June 2006 qu. 2

   (i) Evaluate $27^{-\frac{2}{3}}$. [2]

   (ii) Express $5\sqrt{5}$ in the form 5^n. [1]

   (iii) Express $\dfrac{1-\sqrt{5}}{3+\sqrt{5}}$ in the form $a + b\sqrt{5}$. [3]

10. June 2008 qu. 1
Express each of the following in the form 4^n:
(i) $\dfrac{1}{16}$, [1]
(ii) 64, [1]
(iii) 8. [2]

11. Jan 2008 qu. 1
Express $\dfrac{4}{3-\sqrt{7}}$ in the form $a+b\sqrt{7}$, where a and b are integers. [3]

12. Jan 2008 qu. 4
Solve the equations
(i) $10^p = 0.1$, [1]
(ii) $\left(25k^2\right)^{\frac{1}{2}} = 15$, [3]
(iii) $t^{-\frac{1}{3}} = \dfrac{1}{2}$. [2]

13. June 2007 qu. 3
Simplify the following, expressing each answer in the form $a\sqrt{5}$.
(i) $3\sqrt{10} \times \sqrt{2}$ [2]
(ii) $\sqrt{500} + \sqrt{125}$ [3]

14. Jan 2007 qu. 1
Express $\dfrac{5}{2-\sqrt{3}}$ in the form $a+b\sqrt{3}$, where a and b are integers. [3]

15. Jan 2007 qu. 2
Evaluate
(i) 6^0, [1]
(ii) $2^{-1} \times 32^{\frac{4}{5}}$. [3]

16. Jan 2006 qu. 1
Solve the equations
(i) $x^{\frac{1}{3}} = 2$, [1]
(ii) $10^t = 1$, [1]
(iii) $(y^{-2})^2 = \dfrac{1}{81}$. [2]

17. June 2005 qu. 5

(a) Simplify $2x^{\frac{2}{3}} \times 3x^{-1}$ [2]

(b) Express $2^{40} \times 4^{30}$ in the form 2^n. [2]

(c) Express $\dfrac{26}{4-\sqrt{3}}$ in the form $a+b\sqrt{3}$. [3]