Surds Past Edexcel Exam Questions

1. (a) Write $\sqrt{45}$ in the form $a\sqrt{5}$, where a is an integer. [1]

   (b) Express $\frac{2(3+\sqrt{5})}{(3-\sqrt{5})}$ in the form $b + c\sqrt{5}$, where b and c are integers. [5]

Question 5 - Jan 2006

2. (a) Expand and simplify $(4 + \sqrt{3})(4 - \sqrt{3})$. [2]

   (b) Express $\frac{26}{4+\sqrt{3}}$ in the form $a + b\sqrt{3}$, where a and b are integers. [2]

Question 6 - May 2006

3. (a) Express $\sqrt{108}$ in the form $a\sqrt{3}$, where a is an integer. [1]

   (b) Express $(2 - \sqrt{3})^2$ in the form $b + c\sqrt{3}$, where b and c are integers to be found. [3]

Question 2 - Jan 2007

4. Simplify $(3 + \sqrt{5})(3 - \sqrt{5})$. [2]

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Question 1 - May 2007

5. Simplify

$$\frac{5 - \sqrt{3}}{2 + \sqrt{3}}$$

   giving your answer in the form $a + b\sqrt{3}$, where a and b are integers. [4]

Question 3 - Jan 2008

6. Expand and simplify $(\sqrt{7} + 2)(\sqrt{7} - 2)$. [2]

Question 3 - Jan 2009

7. Simplify

   (a) $(3\sqrt{7})^2$, [1]

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

Question 1 - Jun 2009

8. (a) Expand and simplify $\left(7+\sqrt{5}\right)\left(3-\sqrt{5}\right)$. [3]

   (b) Express $\frac{7+\sqrt{5}}{3+\sqrt{5}}$ in the form $a+b\sqrt{5}$, where a and b are integers. [3]

Question 2 - Jan 2010

9. Write

$$\sqrt{75}-\sqrt{27}$$

in the form $k\sqrt{x}$, where k and x are integers. [2]

Question 1 - Jun 2010

10. Simplify

$$\frac{5-2\sqrt{3}}{\sqrt{3}-1},$$

giving your answer in the form $p+q\sqrt{3}$, where p and q are rational numbers. [4]

Question 3 - Jan 2011

11. (a) Simplify

$$\sqrt{32}+\sqrt{18}$$

giving your answer in the form $a\sqrt{2}$, where a is an integer. [2]

(b) Simplify

$$\frac{\sqrt{32}+\sqrt{18}}{3+\sqrt{2}},$$

giving your answer in the form $b\sqrt{2}+c$, where b and c are integers. [4]

Question 2 - Jan 2012

12. Show that $\frac{2}{\sqrt{12}-\sqrt{8}}$ can be written in the form $\sqrt{a}+\sqrt{b}$, where a and b are integers. [5]

Question 3 - Jun 2012

13. (a) Express

$$\left(5-\sqrt{8}\right)\left(1+\sqrt{2}\right)$$

in the form $a+b\sqrt{2}$, where a and b are integers. [3]

(b) Express

$$\sqrt{80}+\frac{30}{\sqrt{5}}$$

in the form $c\sqrt{5}$, where c is an integer. [3]

Question 3 - January 2013

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14. Simplify

$$\frac{7+\sqrt{5}}{\sqrt{5}-1}$$

giving your answer in the form $a+b\sqrt{5}$, where a and b are integers. [4]

Question 1 - May 2013

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15. (a) Write $\sqrt{80}$ in the form $c\sqrt{5}$, where c is a positive constant. [1]

A rectangle R has a length of $\left(1+\sqrt{5}\right)$cm and an area of $\sqrt{80}$ cm^2.

(b) Calculate the width of R in cm. Express your answer in the form $p+q\sqrt{5}$, where p and q are integers to be found. [4]

Question 6 - May 2014

Solutions

1. (a) $3\sqrt{5}$
   (b) $7 + 3\sqrt{5}$
2. (a) 13
   (b) $8 - 2\sqrt{3}$
3. (a) $6\sqrt{3}$
   (b) $7 - 4\sqrt{3}$
4. 4
5. $13 - 7\sqrt{3}$
6. 3
7. (a) 63
   (b) $11 - 6\sqrt{5}$
8. (a) $16 - 4\sqrt{5}$
   (b) $4 - \sqrt{5}$
9. $2\sqrt{3}$
10. $-\frac{1}{2} + \frac{3}{2}\sqrt{3}$
11. (a) $7\sqrt{2}$
    (b) $3\sqrt{2} - 2$
12. $\sqrt{3} + \sqrt{2}$
13. (a) $1 + 3\sqrt{2}$
    (b) $10\sqrt{5}$
14. $3 + 2\sqrt{5}$
15. (a) $4\sqrt{5}$
    (b) $5 - \sqrt{5}$