Firrhill High School

Mathematics Department

Level 5

Assessment Questions

Surds
&
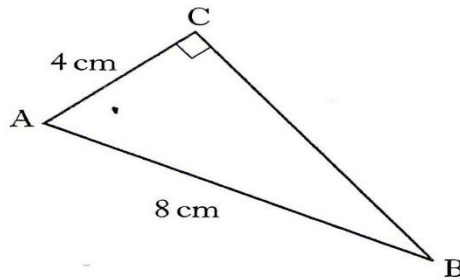# Indices

1. 2009 Credit Paper 1 Q4

(c) Expand

$$x^{\frac{1}{2}}\left(3x + x^{-2}\right).$$

2. 2009 Credit Paper 1 Q5

In triangle ABC:

- angle ACB = 90°
- AB = 8 centimetres
- AC = 4 centimetres.

Calculate the length of BC.

Give your answer **as a surd in its simplest form**.

3

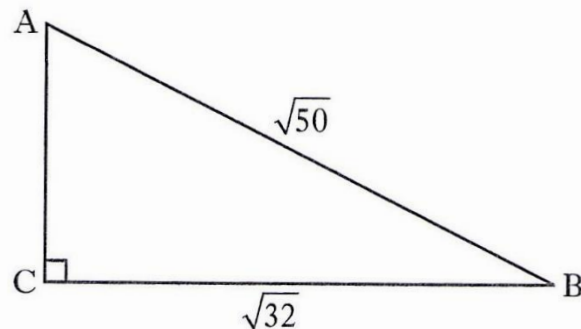## 3. 2008 Credit Paper 1 Q9

Simplify

$$m^3 \times \sqrt{m}.$$

2

4. 2008 Credit Paper 1 Q11

A right angled triangle has dimensions as shown.

Calculate the length of AC, leaving your answer as a surd **in its simplest form**.

3

5. 2007 Credit Paper 1 Q7

Remove brackets and simplify

$$a^{\frac{1}{2}}(a^{\frac{1}{2}} - 2).$$

2

6. 2006 Credit Paper 1 Q4

(b) Expand

$$m^{\frac{1}{2}}(2 + m^2).$$

2

(c). Simplify, leaving your answer as a surd

$$2\sqrt{20} - 3\sqrt{5}.$$

2

7. 2005 Credit Paper 1 Q11

$$f(x) = 4\sqrt{x} + \sqrt{2}$$

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(a) Find the value of $f(72)$ as a surd in its simplest form.

3

(b) Find the value of t, given that $f(t) = 3\sqrt{2}$.

3

8. 2004 Credit Paper 1 Q11

(a) Simplify $\quad 2\sqrt{75}.$

2

(b) Evaluate $\quad 2^0 + 3^{-1}.$

2

9. 2003 Credit Paper 1 Q12

(a) Evaluate

$$8^{\frac{2}{3}}.$$

2

(b) Simplify

$$\frac{\sqrt{24}}{\sqrt{2}}.$$

2

10.   2002 Credit Paper 1 Q10

Simplify

$$\sqrt{27} + 2\sqrt{3}.$$

11.   2002 Credit Paper 1 Q11

Express in its simplest form

$$y^8 \times (y^3)^{-2}.$$

2

12.   2001 Credit Paper 1 Q10

Simplify

$$\frac{\sqrt{3}}{\sqrt{24}}.$$

Express your answer as a fraction with a rational denominator.

13.   2000 Credit Paper 1 Q9

(a) Remove the brackets and simplify

$$a^{\frac{1}{2}}\left(a + \frac{1}{a}\right).$$

2

(b) Express $\sqrt{18} - \sqrt{2}$ as a surd in its simplest form.

2

14.   1999 Credit Paper 1 Q10

$$f(x) = 3^x$$

(a) Find $f(4)$.

1

(b) Given that $f(x) = \sqrt{27}$, find x.

3

15. 1998 Credit Paper 1 Q9

(a) Multiply out the brackets

$$\sqrt{2}(\sqrt{6} - \sqrt{2}).$$

Express your answer as a **surd** in its simplest form.   **2**

(b) Express $\dfrac{b^{\frac{1}{2}} \times b^{\frac{3}{2}}}{b}$ in its simplest form.   **2**

16. 2011 Credit Paper 1 Q9

(a) Simplify $\qquad 2a \times a^{-4}.$ **1**

(b) Solve for x, $\qquad \sqrt{x} + \sqrt{18} = 4\sqrt{2}.$ **3**

17. 2011 Int 2 Paper 1 Q4

Three of the following have the same value.

$$2\sqrt{6}, \qquad \sqrt{2} \times \sqrt{12}, \qquad 3\sqrt{8}, \qquad \sqrt{24}.$$

Which one has a different value?

You must give a reason for your answer.   **2**

18. 2011 Int 2 Paper 1 Q6

Evaluate

$$9^{\frac{3}{2}}.$$ **2**

19. 2012 Credit Paper 1 Q9

(a) Evaluate $(2^3)^2.$ **1**

(b) Hence find n, when $(2^3)^n = \dfrac{1}{64}.$ **1**

20. 2012 Int 2 Paper 1 Q10

Simplify $\sqrt{2}\left(\sqrt{3} + \sqrt{2}\right) - \sqrt{6}.$ **2**

21. 2012 Int 2 Paper 2 Q11

Simplify, expressing your answer with positive indices.

$$(x^2 y^4) \div (x^{-3} y^6)$$ **2**

22. **2013 Credit Paper 2 Q10**

A function is given by the formula, $f(x) = 4 \times 2^x$.

(a) Evaluate $f(3)$.   2

(b) Given that $f(m) = 4$, find the value of m.   2

23. **2013 Int 2 Paper 2 Q9**

Simplify $\dfrac{x^6}{y^2} \times \dfrac{y^3}{x^3}$.   2

24. **2014 N5 Paper 1 Q8**

Express $\sqrt{40} + 4\sqrt{10} + \sqrt{90}$ as a surd in its simplest form.   3
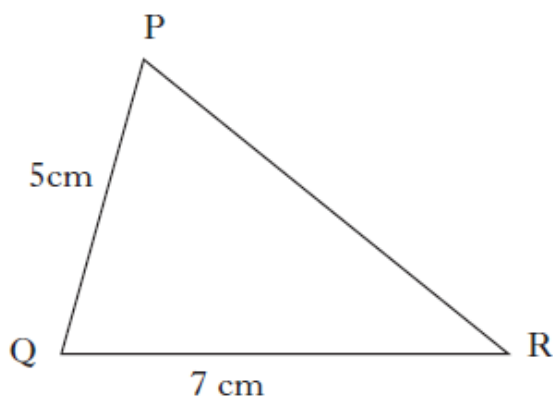
25. **2014 N5 Paper 2 Q8**

Simplify $\dfrac{n^5 \times 10n}{2n^2}$.   3

26. **2014 Int 2 Paper 1 Q3**

In triangle PQR, PQ = 5 centimetres, QR = 7 centimetres and $\cos Q = \dfrac{1}{5}$.
Calculate the length of side PR.
Give your answer in the form $\sqrt{a}$.   3

27. **2014 Int 2 Paper 1 Q5**

Express $\sqrt{40} + 4\sqrt{10} + \sqrt{90}$ as a surd in its simplest form.   3

28. **2014 Int 2 Paper 2 Q8**

Simplify $\dfrac{8p^6}{2p^3 \times p}$.   3

29. **2015 N5 Paper 1 Q13**

Express $\dfrac{4}{\sqrt{8}}$ with a rational denominator.

Give your answer in its simplest form. 3

30. **2015 N5 Paper 1 Q14**

Evaluate $8^{\frac{5}{3}}$. 2

31. **2015 Int 2 Paper 1 Q 10**

Express $\sqrt{45} + 6\sqrt{5} - \sqrt{20}$ as a surd in its simplest form. 3

32. **2015 Int 2 Paper 2 Q7**

Simplify $\dfrac{5p^7 \times 4p^{-2}}{2p}$. 3