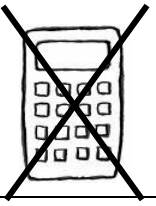
Name:	Teacher Assessment



Section A Simplifying Expressions Involving Surds Grade B / A

1. Show that $\sqrt{20} = 2\sqrt{5}$

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(Total 1 mark)

2. Simplify fully $\sqrt{75}+\sqrt{27}$. You **must** show your working.

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Answer ……

(Total 2 marks)

3. Simplify $\sqrt{18}+\sqrt{32}$

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Answer .....

(Total 2 marks)

4. You are given that $\sqrt{12} + \sqrt{27} = a\sqrt{3}$ where a is an integer.

Find the value of a.

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Answer .....

(Total 2 marks)

5. Write each of these in the form $p\sqrt{3}$, where p is an integer.

(a) $\sqrt{6} \times \sqrt{50}$

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Answer .....

(2)

(b) $\sqrt{48} + \sqrt{75}$

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Answer .....

(2)

(Total 4 marks)

6. (a) Simplify

(i) $\sqrt{3} + \sqrt{3}$

Answer .....

(1)

(ii) $\sqrt{3} \times \sqrt{3}$

Answer .....

(1)

(b) Show that $\dfrac{\sqrt{75} - \sqrt{12}}{\sqrt{75} + \sqrt{12}}$ simplifies to $\dfrac{3}{7}$

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(3)

(Total 5 marks)

7. (a) Express $\sqrt{5} + \sqrt{20}$ in the form $p\sqrt{5}$

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Answer .....

(2)

(b) Hence, or otherwise, simplify fully $\dfrac{\sqrt{5}+\sqrt{20}}{\sqrt{45}-\sqrt{20}}$

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Answer .....

(3)

(Total 5 marks)

8. Simplify fully $\dfrac{\sqrt{150}-\sqrt{6}}{\sqrt{12}}$

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Answer .....

(Total 4 marks)

9. Show that $\dfrac{\sqrt{125}-\sqrt{45}}{\sqrt{125}+\sqrt{45}} = \dfrac{1}{4}$

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(Total 3 marks)

10. (a) Simplify fully the following expression, leaving your answer in surd form.

$$\sqrt{75} - \sqrt{12}$$

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Answer .....

(2)

(b) Given that $135 = 3^3 \times 5$, simplify the expression $\dfrac{\sqrt{135}}{\sqrt{75} - \sqrt{12}}$.

Give your answer in surd form.

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Answer .....

(3)(Total 5 marks)

11. (a) Write $\sqrt{600} + \sqrt{54}$ in the form $p\sqrt{6}$ where p is an integer.

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Answer .....

(2)

(b) Hence write $\dfrac{\sqrt{600} + \sqrt{54}}{\sqrt{338}}$ in the form $\sqrt{q}$.

You may use $338 = 2 \times 13^2$

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Answer .....

(2)(Total 4 marks)

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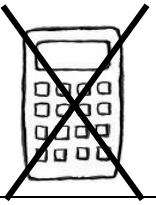

Section B Expanding Brackets Involving Surds Grade A*

1. Expand and simplify $(3 + \sqrt{7})^2$

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Answer .....

(Total 2 marks)

2. Expand and simplify $(\sqrt{2} + \sqrt{10})^2$

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Answer .....

(Total 2 marks)

3. Show that $\left(\sqrt{3} + \sqrt{12}\right)^2 = 27$

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(Total 2 marks)

4. Show that $(\sqrt{32} + \sqrt{2})^2 = 50$

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(Total 2 marks)

5. Show that $\left(\sqrt{50} - \sqrt{2}\right)^2$ is an integer.

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(Total 2 marks)

6. Multiply out and simplify $(x + \sqrt{6})^2$.

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Answer .....

(Total 2 marks)

7. Work out $2\sqrt{3}\left(\sqrt{3} + \sqrt{8}\right)$

Give your answer in the form $a + b\sqrt{6}$ where *a* and *b* are integers.

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Answer .....

(Total 3 marks)

8. (a) Simplify $\sqrt{8} + \sqrt{50}$

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Answer .....

(2)

(b) Hence simplify

$$(\sqrt{8} + \sqrt{50})(\sqrt{24} + \sqrt{54})$$

giving your answer in its simplest surd form.

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Answer .....

(3)

(Total 5 marks)

9. Show that $\sqrt{12}\left(\sqrt{75}-\sqrt{48}\right)=6$

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(Total 3 marks)

10. Show that $(\sqrt{48}+\sqrt{24})^2$ can be expressed in the form $p + q\sqrt{2}$
where p and q are integers to be found.

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Answer .....

(Total 3 marks)

11. Expand and simplify

$$(2+3\sqrt{3})(4\sqrt{2}-\sqrt{3})$$

Give your answer in the form

$$a + b\sqrt{2} + c\sqrt{3} + d\sqrt{6}$$

where a, b, c and d are integers.

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Answer .....

(Total 3 marks)

12. Find the value of $(m + p)^2$ when $m = \sqrt{2}$ and $p = \sqrt{8}$

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Answer .....

(Total 2 marks)

13. Find values of a and b such that

$$(2 + \sqrt{3})(4 - \sqrt{3}) = a + b\sqrt{3}$$

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Answer a = ... b = ...

(Total 2 marks)

Success:	Target:

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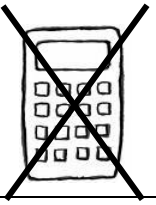

Section C Rationalising The Denominator Grade A / A*

1. Rationalise $\frac{1}{\sqrt{6}}$

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Answer .....

(Total 1 mark)

2. Rationalise and simplify $\frac{1}{\sqrt{8}}$

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Answer .....

(Total 2 marks)

3. Rationalise the denominator and simplify fully $\frac{1}{\sqrt{12}}$

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Answer .....

(Total 2 marks)

4. By rationalising the denominator, simplify $\frac{15}{\sqrt{5}}$

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Answer .....

(Total 2 marks)

5. Rationalise the denominator and simplify $\frac{21}{\sqrt{7}}$

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Answer .....

(Total 2 marks)

6. Rationalise the denominator of $\frac{18}{\sqrt{3}}$ and simplify your answer fully.

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Answer .....

(Total 2 marks)

7. Rationalise the denominator and simplify fully $\frac{18}{\sqrt{2}}$

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Answer .....

(Total 2 marks)

8. Simplify $\frac{10}{\sqrt{5}}$ by rationalising the denominator. Give your answer in its simplest form.

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Answer ……

(Total 2 marks)

9. Write $\frac{18}{\sqrt{3}}$ in the form $p\sqrt{3}$, where p is an integer.

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Answer .....

(Total 2 marks)

10. Rationalise the denominator of $\frac{2+\sqrt{3}}{\sqrt{3}}$. Simplify your answer fully.

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Answer .....

(Total 3 marks)

11. Rationalise the denominator and simplify $\frac{2}{3+\sqrt{5}}$.

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Answer .....

(Total 4 marks)

12. Rationalise the denominator and simplify $\frac{2+\sqrt{3}}{5-\sqrt{3}}$.

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Answer .....

(Total 4 marks)

Success:	Target:

Teacher Assessment

Section D Problem Solving Using Surds Grade A*

1. (a) Simplify fully $\sqrt{2}(\sqrt{8}-\sqrt{2})$

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Answer ……..

(2)

(b) Given that $x=\sqrt{2}$ $y=\sqrt{5}$ $z=\sqrt{10}$

work out the value of $\frac{y}{xz}$

Write your answer in its simplest form.

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……

Answer ……..

(2)
(Total 4 marks)

2. (a) Find the value of m when $\sqrt{75}-\frac{9}{\sqrt{3}}=m\sqrt{3}$

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Answer m = ...

(3)

(b) Given that $r = \sqrt{6}, s = \sqrt{8}$ and $t = \sqrt{12}$

(i) Simplify fully, $\frac{t}{rs}$

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Answer .....

(2)

(ii) Show that $\frac{r+t}{2+s} = \frac{\sqrt{6}}{2}$

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(2)

(Total 7 marks)

3. The area of this rectangle is 30 cm^2.

Find the value of x, writing your answer in the form $a\sqrt{b}$ where a and b are integers.

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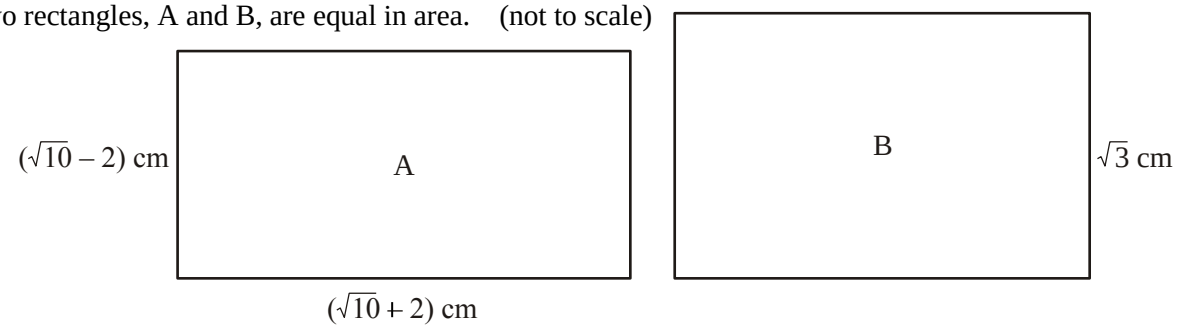
Answer .....cm

(Total 3 marks)

4. Two rectangles, A and B, are equal in area. (not to scale)



Calculate the length of rectangle B. Give your Answer in the form $p\sqrt{3}$.

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Answer ..... cm

(Total 4 marks)

5. Surd castle has a drawbridge made in the shape of a cuboid. All dimensions are given in metres.

The dimensions of the drawbridge are height $=\sqrt{20}$, width $=\sqrt{5}$ and thickness $=\dfrac{1}{\sqrt{2}}$

(a) Find the volume of the drawbridge. Give your answer in the form $a\sqrt{2}$, where *a* is an integer.

Volume of a cuboid = height × width × thickness

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…….

…….

Answer …….. m^3

(3)

(b) Show that the surface area, in m^2, of the drawbridge is $20+3\sqrt{10}$

Surface area of a cuboid = 2 × height × width + 2 × height × thickness + 2 × width × thickness

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Success:	Target:

(3)(Total 6 marks)