1.1 Higher Surds: Simplifying, Multiplying and Dividing: 30-minute Pack

AQA 8365 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Work out each product, giving your answer in its simplest form.

(a) $\sqrt{3} \times \sqrt{12}$ **(2)**

(b) $\sqrt{5} \times \sqrt{20}$ **(2)**

(c) $2\sqrt{3} \times 3\sqrt{6}$ **(2)**

(Total for Question 1 is 6 marks)

© Revision Library | revisionlibrary.co.uk

2 Rationalise the denominator of each expression, simplifying fully.

(a) $1 / \sqrt{3}$ **(2)**

(b) $5 / \sqrt{2}$ **(2)**

(c) $6 / \sqrt{12}$ **(2)**

(Total for Question 2 is 6 marks)

---

3 Given that $x \times \sqrt{2} = \sqrt{8} + \sqrt{18}$, find the value of the integer x.

(Total for Question 3 is 4 marks)

---

4 Simplify $3\sqrt{3} - 3\sqrt{75}$, giving your answer in the form $a\sqrt{b}$.

(Total for Question 4 is 3 marks)

---

5 Write $\sqrt{72}$ in the form $a\sqrt{b}$, where a and b are integers and b is as small as possible.

(Total for Question 5 is 2 marks)

© Revision Library | revisionlibrary.co.uk

6 Expand and simplify $(-1 + 2\sqrt{3})(-2 + \sqrt{3})$. Give your answer in the form $p + q\sqrt{s}$.

(Total for Question 6 is 3 marks)

---

7 Work out $5\sqrt{18} \times 5\sqrt{12}$. Give your answer in its simplest surd form.

(Total for Question 7 is 3 marks)

© Revision Library | revisionlibrary.co.uk

Mark scheme · 1.1 Higher Surds: Simplifying, Multiplying and Dividing: 30-minute Pack

Question 1

(a) combines to $\sqrt{36}$ oe	**M1**
(a) 6 cao	**A1**
(a) Answer: 6	
(b) combines to $\sqrt{100}$ oe	**M1**
(b) 10 cao	**A1**
(b) Answer: 10	
(c) $6\sqrt{18}$ oe (multiplies integer parts and surd parts)	**M1**
(c) $18\sqrt{2}$ cao	**A1**
(c) Answer: $18\sqrt{2}$	

Question 2

(a) multiplies numerator and denominator by $\sqrt{3}$	**M1**
(a) $\sqrt{3}/3$ oe cao	**A1**
(a) Answer: $\sqrt{3}/3$	
(b) multiplies numerator and denominator by $\sqrt{2}$	**M1**
(b) $5\sqrt{2}/2$ oe cao	**A1**
(b) Answer: $5\sqrt{2}/2$	
(c) simplifies $\sqrt{12}$ to $2\sqrt{3}$ or rationalises directly	**M1**
(c) $\sqrt{3}$ cao	**A1**
(c) Answer: $\sqrt{3}$	

Question 3

simplifies $\sqrt{8}$ to $2\sqrt{2}$	**M1**
simplifies $\sqrt{18}$ to $3\sqrt{2}$	**M1**
combines right-hand side to $5\sqrt{2}$	**M1**
x = 5 cao	**A1**
Answer: x = 5	

Question 4

at least two surds simplified to a multiple of $\sqrt{3}$	**M1**
all surds expressed as multiples of $\sqrt{3}$	**M1**
$-12\sqrt{3}$ cao	**A1**
Answer: $-12\sqrt{3}$	

Question 5

36 x 2 or a square factor of 72 identified	**M1**
$6\sqrt{2}$ cao	**A1**
Answer: $6\sqrt{2}$	

Question 6

at least 3 of the 4 terms correct	**M1**
collects rational and surd parts	**M1**
$8 - 5\sqrt{3}$ cao	**A1**
Answer: $8 - 5\sqrt{3}$	

Question 7

$25\sqrt{216}$ or equivalent	**M1**
$\sqrt{216} = 6\sqrt{6}$ or a square factor extracted	**M1**
$150\sqrt{6}$ cao	**A1**
Answer: $150\sqrt{6}$	

© Revision Library | revisionlibrary.co.uk