THIRD SPACE LEARNING

Simplifying Surds - Worksheet

Skill

Group A - Simplifying surds

Simplify:

1) $\sqrt{4}$ **2)** $\sqrt{40}$ **3)** $\sqrt{200}$

4) $\sqrt{12}$ **5)** $\sqrt{20}$ **6)** $\sqrt{24}$

7) $\sqrt{9}$ **8)** $\sqrt{900}$ **9)** $\sqrt{9000}$

10) $\sqrt{18}$ **11)** $\sqrt{27}$ **12)** $\sqrt{36}$

Group B - Simplifying surds

Simplify fully:

1) $\sqrt{32}$ **2)** $\sqrt{48}$ **3)** $\sqrt{80}$

4) $\sqrt{75}$ **5)** $\sqrt{125}$ **6)** $\sqrt{175}$

7) $\sqrt{72}$ **8)** $\sqrt{180}$ **9)** $\sqrt{288}$

10) $2\sqrt{72}$ **11)** $3\sqrt{18}$ **12)** $3\sqrt{12}$

Group C - Simplifying surds

Simplify fully:

1) $\sqrt{200}$ **2)** $\sqrt{2000}$ **3)** $\sqrt{1200}$

4) $\sqrt{96}$ **5)** $\sqrt{192}$ **6)** $\sqrt{320}$

7) $\sqrt{98}$ **8)** $\sqrt{245}$ **9)** $\sqrt{343}$

10) $2\sqrt{207}$ **11)** $4\sqrt{315}$ **12)** $3\sqrt{468}$
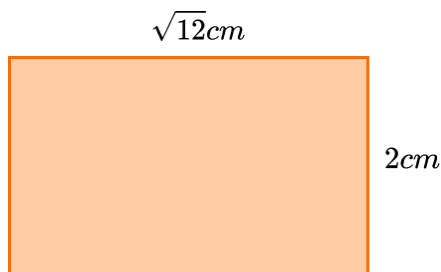
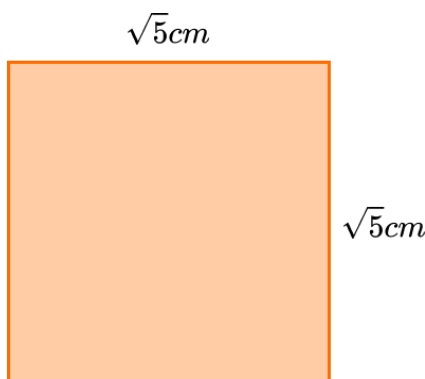## Simplifying Surds - Worksheet

Applied

1) **(a)** Show that $\sqrt{56}$ can be written in the form $a\sqrt{b}$, where a and b are integers to be found.

(b) Hence write $\sqrt{224}$ as a surd in its simplest form.

2) **(a)** Find the area of this rectangle as a surd in its simplest form.

$\sqrt{12}cm$

$2cm$

(b) What is the area of this square?

$\sqrt{5}cm$

$\sqrt{5}cm$

3) **(a)** By writing $\sqrt{a}$ as $a^{\frac{1}{2}}$, show that $\left(\sqrt{a}\right)^2 = a$.

(b) 235 written as a product of prime factors is 5×47. Use this fact to explain why $\sqrt{235}$ will not simplify further.

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Simplifying Surds - Exam Questions

1)   Simplify $\sqrt{50}$.

....

(2 marks)

2)   Simplify $\sqrt{80}$.

....

(2 marks)

3)   Simplify $\sqrt{63}$.

....

(2 marks)

4)   Simplify $\sqrt{128}$.

....

(2 marks)

5)   Show that $\sqrt{6048}$ can be written in the form $k\sqrt{42}$,
where k is an integer to be found.

....

(2 marks)

6)   Show that $\sqrt{504}$ can be written in the form $6\sqrt{k}$,
where k is an integer to be found.

....

(2 marks)

7)   Simplify fully $5\sqrt{88}$.

....

(2 marks)

8)   Simplify fully $4\sqrt{54}$.

....

(2 marks)

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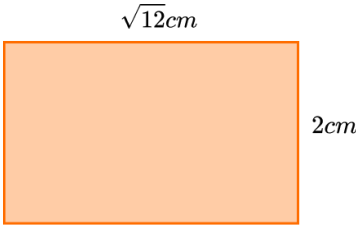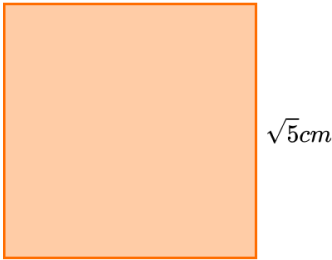
Simplifying Surds - Answers

	Question	Answer
	Skill Questions	
Group A	Simplify: **1)** $\sqrt{4}$ **2)** $\sqrt{40}$ **3)** $\sqrt{200}$ **4)** $\sqrt{12}$ **5)** $\sqrt{20}$ **6)** $\sqrt{24}$ **7)** $\sqrt{9}$ **8)** $\sqrt{900}$ **9)** $\sqrt{9000}$ **10)** $\sqrt{18}$ **11)** $\sqrt{27}$ **12)** $\sqrt{36}$	**1)** 2 **2)** $2\sqrt{10}$ **3)** $10\sqrt{2}$ **4)** $2\sqrt{3}$ **5)** $2\sqrt{5}$ **6)** $2\sqrt{6}$ **7)** 3 **8)** 30 **9)** $30\sqrt{10}$ **10)** $3\sqrt{2}$ **11)** $3\sqrt{3}$ **12)** 6
Group B	Simplify fully: **1)** $\sqrt{32}$ **2)** $\sqrt{48}$ **3)** $\sqrt{80}$ **4)** $\sqrt{75}$ **5)** $\sqrt{125}$ **6)** $\sqrt{175}$ **7)** $\sqrt{72}$ **8)** $\sqrt{180}$ **9)** $\sqrt{288}$ **10)** $2\sqrt{72}$ **11)** $3\sqrt{18}$ **12)** $3\sqrt{12}$	**1)** $4\sqrt{2}$ **2)** $4\sqrt{3}$ **3)** $4\sqrt{5}$ **4)** $5\sqrt{3}$ **5)** $5\sqrt{5}$ **6)** $5\sqrt{7}$ **7)** $6\sqrt{2}$ **8)** $6\sqrt{5}$ **9)** $12\sqrt{2}$ **10)** $12\sqrt{2}$ **11)** $9\sqrt{2}$ **12)** $6\sqrt{3}$

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Simplifying Surds - Answers

Group C	Simplify fully:	
	1) $\sqrt{200}$	**1)** $10\sqrt{2}$
	2) $\sqrt{2000}$	**2)** $20\sqrt{5}$
	3) $\sqrt{1200}$	**3)** $20\sqrt{3}$
	4) $\sqrt{96}$	**4)** $4\sqrt{6}$
	5) $\sqrt{192}$	**5)** $8\sqrt{3}$
	6) $\sqrt{320}$	**6)** $8\sqrt{5}$
	7) $\sqrt{98}$	**7)** $7\sqrt{2}$
	8) $\sqrt{245}$	**8)** $7\sqrt{5}$
	9) $\sqrt{343}$	**9)** $7\sqrt{7}$
	10) $2\sqrt{207}$	**10)** $6\sqrt{23}$
	11) $4\sqrt{315}$	**11)** $12\sqrt{35}$
	12) $3\sqrt{468}$	**12)** $18\sqrt{13}$

Simplifying Surds - Answers

	Question	Answer
	Applied Questions	
1)	**(a)** Show that $\sqrt{56}$ can be written in the form $a\sqrt{b}$, where a and b are integers to be found.	**(a)** $2\sqrt{14}$
	(b) Hence write $\sqrt{224}$ as a surd in its simplest form.	**(b)** $4\sqrt{14}$
2)	**(a)** Find the area of this rectangle as a surd in its simplest form. $\sqrt{12}cm$ $2cm$	**(a)** $2\sqrt{12} = 4\sqrt{3}(cm^2)$
	(b) What is the area of this square? $\sqrt{5}cm$ $\sqrt{5}cm$	**(b)** $5cm^2$
3)	**(a)** By writing $\sqrt{a}$ as $a^{\frac{1}{2}}$, show that $\left(\sqrt{a}\right)^2 = a$.	**(a)** $\left(\sqrt{a}\right)^2 = \left(a^{\frac{1}{2}}\right)^2$ $= a^{\frac{1}{2}} \times a^{\frac{1}{2}}$ $= a^1$ $= a$
	(b) 235 written as a product of prime factors is 5×47. Use this fact to explain why $\sqrt{235}$ will not simplify further.	**(b)** The only two factors of 235 are 5 and 47. Neither of those are square numbers, so the surd cannot be simplified.

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Simplifying Surds - Mark Scheme

	Question	Answer	
	Exam Questions		
1)	Simplify $\sqrt{50}$.	$5\sqrt{2}$ $k\sqrt{2}$ or $5\sqrt{k}$ Fully correct answer	**(2)**
2)	Simplify $\sqrt{80}$.	$4\sqrt{5}$ $k\sqrt{5}$ or $4\sqrt{k}$ Fully correct answer	**(2)**
3)	Simplify $\sqrt{63}$.	$3\sqrt{7}$ $k\sqrt{7}$ or $3\sqrt{k}$ Fully correct answer	**(2)**
4)	Simplify $\sqrt{128}$.	$8\sqrt{2}$ $k\sqrt{2}$ or $8\sqrt{k}$ Fully correct answer	**(2)**
5)	Show that $\sqrt{6048}$ can be written in the form $k\sqrt{42}$, where k is an integer to be found.	$\sqrt{6048} = 12\sqrt{42}$ $6048 = 42 \times 144$ or sight of 144 $k = 12$	**(2)**
6)	Show that $\sqrt{504}$ can be written in the form $6\sqrt{k}$, where k is an integer to be found.	$\sqrt{504} = 6\sqrt{14}$ $504 = 36 \times 14$ or sight of 36 $k = 14$	**(2)**
7)	Simplify fully $5\sqrt{88}$.	$10\sqrt{22}$ $k\sqrt{22}$ or $10\sqrt{k}$ Fully correct answer	**(2)**
8)	Simplify fully $4\sqrt{54}$.	$12\sqrt{6}$ $k\sqrt{6}$ or $12\sqrt{k}$ Fully correct answer	**(2)**

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