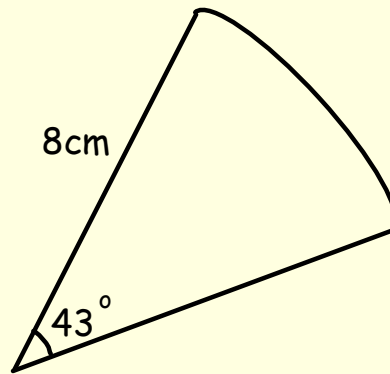


Starter

For the sector shown calculate:

- a) Arc Length
- b) Sector Area



Surds

Today we are learning...

How to simplify and perform operations involving surds.

I will know if I have been successful if...

I can simplify a surd.

I can expand brackets involving surds.

I can add and subtract surds to simplify where possible.



Simplifying Surds

Simplify the following surds.

a) $\sqrt{50}$

b) $\sqrt{72}$

c) $\sqrt{300}$

Practice

1. Express each of the following in its simplest form:

(a) $\sqrt{8}$ (b) $\sqrt{12}$ (c) $\sqrt{50}$ (d) $\sqrt{20}$ (e) $\sqrt{24}$ (f) $\sqrt{108}$

(g) $\sqrt{60}$ (h) $\sqrt{72}$ (i) $\sqrt{300}$ (j) $\sqrt{27}$ (k) $\sqrt{96}$ (l) $\sqrt{48}$

(m) $\sqrt{45}$ (n) $\sqrt{98}$ (o) $\sqrt{90}$ (p) $\sqrt{18}$ (q) $\sqrt{28}$ (r) $\sqrt{80}$

2. Simplify:

(a) $5\sqrt{8}$ (b) $3\sqrt{32}$ (c) $5\sqrt{40}$ (d) $2\sqrt{12}$ (e) $4\sqrt{18}$ (f) $3\sqrt{24}$

(g) $3\sqrt{27}$ (h) $10\sqrt{48}$ (i) $2\sqrt{108}$ (j) $3\sqrt{45}$ (k) $2\sqrt{63}$ (l) $4\sqrt{20}$

Examples

Addition and Subtraction

1) $3\sqrt{7} + 2\sqrt{7} =$

2) $2\sqrt{6} - \sqrt{6} =$

3) $\sqrt{12} + 2\sqrt{3} =$

Practice

3. Express each of the following in its simplest form:

(a) $5\sqrt{2} + 3\sqrt{2}$

(b) $3\sqrt{7} - \sqrt{7}$

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

(d) $\sqrt{2} + \sqrt{98}$

(e) $\sqrt{80} + \sqrt{20}$

(f) $\sqrt{24} + \sqrt{54}$

(g) $\sqrt{180} - \sqrt{45}$

(h) $\sqrt{1000} - \sqrt{90}$

(i) $\sqrt{50} - \sqrt{8}$

(j) $\sqrt{3} - \sqrt{12}$

(k) $\sqrt{75} + \sqrt{108} - \sqrt{3}$

(l) $\sqrt{5} + \sqrt{20} + \sqrt{80}$

(m) $\sqrt{108} + \sqrt{12}$

(n) $\sqrt{32} - \sqrt{8}$

(o) $\sqrt{72} - \sqrt{50}$

(p) $\sqrt{2} + \sqrt{98}$

(q) $\sqrt{80} + \sqrt{20}$

(r) $\sqrt{24} + \sqrt{54}$

(s) $\sqrt{8} + 5\sqrt{2}$

(t) $3\sqrt{12} + \sqrt{27}$

(u) $3\sqrt{2} + 2\sqrt{8} - \sqrt{18}$

Past Papers - 3 Questions

2014 N5 Past Paper P1, Q8

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

2015 N5 Past Paper P1, Q13

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

Give your answer its simplest form. (3 marks)

N5 Practice Paper A, P1, Q13 (b)

5. Express $\sqrt{18} - \sqrt{2} + \sqrt{72}$ as a surd in its simplest form (3 marks)

Rationalise the Denominator

Today we are learning...

How to rationalise the denominator of a fraction.

I will know if we have been successful if...

I can simplify fractions.

I know what to multiply the fraction by.

I can simplify rationalise the denominator.



Example 1

1) Rationalise $\frac{2}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$

$$\sqrt{3}^2 = \sqrt{9} = 3$$

Example 2

2) Rationalise $\frac{4}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} = \frac{4\sqrt{5}}{5}$

Example 3

3) Rationalise $\frac{\sqrt{8}}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{8}\sqrt{5}}{5}$

$$= \frac{\sqrt{40}}{5}$$
$$= \frac{\sqrt{4 \times 10}}{5}$$
$$= \frac{\sqrt{4}\sqrt{10}}{5}$$
$$= \frac{2\sqrt{10}}{5}$$

Booklets

Page 3

Questions 10 - 14

Summary

Rationalise the following...

$$\frac{2}{\sqrt{5}}$$

or...

$$\frac{\sqrt{5}}{\sqrt{11}}$$

Starter

1) Rationalise $\frac{6}{\sqrt{7}}$

2) Factorise $x^2 + 8x + 12$

3) Factorise $b^2 + 64$

Expanding Brackets Involving Surds

Today we are learning...

How to expand and simplify brackets involving surds.

I will know if I have been successful if...

I can expand single brackets.

I can expand double brackets.

I can simplify surds where possible.



Practice

1) Expand and simplify:

$$\sqrt{5} (\sqrt{3} + 2)$$

Practice

2) Expand and simplify:

$$\sqrt{7} (\sqrt{7} - 3)$$

Practice

3) Expand and simplify:

$$\sqrt{8} (\sqrt{2} - 5)$$

Summary

Choose one expression to expand and simplify:

$$\sqrt{7} (\sqrt{3} + 1)$$

$$\sqrt{5} (\sqrt{10} - 3)$$

Surds Summary

Today we are revising...

All of our work and practicing our surds skills!

I will know if I have been successful if...

I can simplify surds.

I can expand brackets involving surds.

I can solve problems involving surds.



What have we learnt so far?

1) Simplify $\sqrt{72}$

2) Expand $\sqrt{3}(\sqrt{3} - 2)$

3) Expand $(2 + \sqrt{3})^2$

4) Solve the equation $x^2 = 27$

Codebreaker

1) Simplify $\sqrt{75}$

$3\sqrt{5}$	$5\sqrt{11}$	$-2\sqrt{2}$	$2\sqrt{3}$	5	$4\sqrt{5}$	$6\sqrt{2}$	$8\sqrt{5}$	-2	28	$4\sqrt{2}$	-3	$2\sqrt{6}$
$2\sqrt{2}$	23	$12\sqrt{5}$	$7\sqrt{2}$	$5\sqrt{10}$	$3\sqrt{6}$	7	$9\sqrt{2}$	$2\sqrt{13}$	10	$10\sqrt{2}$	$2\sqrt{11}$	$\sqrt{10}$
$\sqrt{7}$	46	$5\sqrt{3}$	$\sqrt{3}$	$2\sqrt{7}$	$10\sqrt{6}$	-1	$2\sqrt{5}$	$\sqrt{13}$	$6\sqrt{6}$	2	$9\sqrt{5}$	$-\sqrt{2}$
$10\sqrt{3}$	9	$5\sqrt{7}$	11	$13\sqrt{2}$	$3\sqrt{11}$	$5\sqrt{2}$	$3\sqrt{3}$	$10\sqrt{5}$	$-7\sqrt{3}$	$4\sqrt{3}$	12	$10\sqrt{7}$
$5\sqrt{5}$	-8	$6\sqrt{3}$	$2\sqrt{3}$	$2\sqrt{10}$	$4\sqrt{6}$	1	$3\sqrt{7}$	6	$6\sqrt{5}$	3	$5\sqrt{6}$	4

Surds Summary

Today we are revising...

All of our work and practicing our surds skills!

I will know if I have been successful if...

I can simplify surds.

I can expand brackets involving surds.

I can solve problems involving surds.

