Unit 5 · Surd

WORKSHEET

Full marks 31

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 31

1 Key words [3]

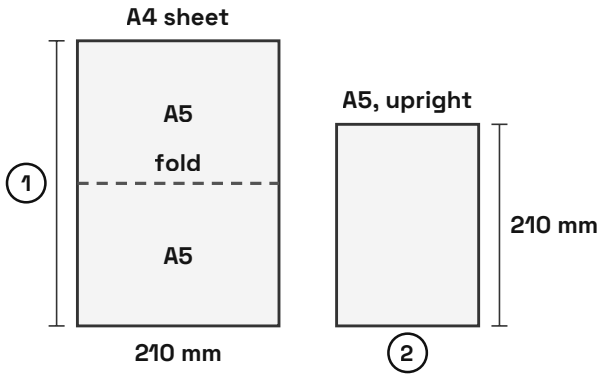
Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

conjugate	false root	like surds	order	rational	surd	verified	vertex

A root whose value is not a rational number, such as $\sqrt{2}$, is a _____. In $\sqrt[3]{5}$, the number 3 is the _____ of the surd. $2\sqrt{3}$ and $5\sqrt{3}$ are _____. To remove the surd from the bottom of $1/(\sqrt{3}-1)$, multiply top and bottom by its _____, $\sqrt{3}+1$. A solution of the squared equation that does not satisfy the original equation is a _____. So every solution of an equation involving surds must be _____.

2 Read the drawing [2]

An A4 sheet is folded in half across its long side. Two lengths on the drawing are left blank: write them in millimeters (A sizes are rounded down to whole millimeters).



1. _____ **2.** _____

3 Multiple choice [5]

Choose the correct option for each of the following questions.

i. Which of these is a surd? [1]

a. $\sqrt{81}$ **b.** $\sqrt[3]{125}$
c. $\sqrt{18}$ **d.** $\sqrt{1.44}$

ii. $\sqrt{48}$ written as a mixed surd is [1]

a. $2\sqrt{12}$ **b.** $4\sqrt{3}$
c. $3\sqrt{4}$ **d.** $16\sqrt{3}$

iii. Squaring both sides of $\sqrt{x+4} = 1 + \sqrt{x}$ gives [1]

a. $x + 4 = 1 + x$ **b.** $x + 4 = 1 + 2\sqrt{x} + x$
c. $x + 16 = 1 + x$ **d.** $x + 4 = 1 + \sqrt{x} + x$

iv. The rationalizing factor of $3 - \sqrt{5}$ is [1]

a. $\sqrt{5}$ **b.** $3 - \sqrt{5}$

c. $3 + \sqrt{5}$ **d.** $\sqrt{3} + \sqrt{5}$

v. What is the solution of $\sqrt{x+7} = x - 5$? [1]

a. $x = 2$ and $x = 9$ **b.** $x = 2$ only

c. $x = 9$ only **d.** no solution

4 Very short answers [3]

Write very short answers to the following questions.

a. Write the order of the surd $\sqrt[4]{7}$. [1]

b. Simplify $\sqrt{12} + \sqrt{27}$. [1]

c. Solve $\sqrt[3]{2x+5} = -1$. [1]

5 Short answers [8]

Write short answers to the following questions.

a. Rationalize the denominator of $\frac{4}{\sqrt{5}+1}$ and simplify. [2]

b. Why can squaring both sides of an equation give a solution that does not satisfy it? Give an example. [2]

c. Solve and verify: $\sqrt{11x^2 + 45} = 4x$ [2]

d. Find the mistake. Bina solves $\sqrt{x} + 3 = 1$: "Squaring, $x + 9 = 1$, so $x = -8$." Find her mistake and give the correct answer. **[2]**

6 Long answers **[8]**

Solve the following problems. Show your working.

a. Solve and verify: $\sqrt{x^2 - 2x - 4} - \sqrt{x^2 - 3x - 3} = 1$ **[4]**

Answer:

b. A pendulum takes $T = 2\pi\sqrt{L/g}$ seconds to swing there and back, where L is its length in meters and $g = 9.8$ m/s^2. Find the length of a pendulum that takes 3 seconds. Is a pendulum clock with it likely to fit on a wall? Explain. **[4]**

Answer:

7 Think **[2]**

Think, then answer.

Without solving it, explain why $\sqrt{x - 3} + \sqrt{x + 6} = 2$ has no solution.

8 Activity: The shape of a sheet of paper (not marked)

Work with a partner. Measure the sides of an A4 sheet in millimeters. Fold it in half across its long side and measure a half, then fold again. Fill in the table and work out long side ÷ short side for each.

Sheet	Short side (mm)	Long side (mm)	Long ÷ short
A4			
A5 (half)			
A6 (quarter)			