Unit 5 · Surd

HARDER WORKSHEET

Full marks 21

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 21

1 Multiple choice [3]

Choose the correct option for each of the following questions.

i. How many solutions has $\sqrt{x-5} = -2$? [1]

a. one, $x = 9$ **b.** one, $x = 1$

c. two **d.** none

ii. $x = 3$ is a solution of $\sqrt{x+k} = x$. What is k? [1]

a. 3 **b.** 6

c. 9 **d.** -6

iii. Which equation can never have a false root, whatever the numbers? [1]

a. $\sqrt{ax+b} = x$ **b.** $\sqrt[3]{ax+b} = x$

c. $\sqrt{ax+b} = \sqrt{x} + 1$ **d.** $\sqrt{x^2+a} = bx$

2 Short answers [8]

Write short answers to the following questions.

a. Solve $\dfrac{\sqrt{x}+2}{\sqrt{x}-2} = 3$ and verify. [2]

b. Find the mistake. Hari solves $\sqrt{x} + 2 = \sqrt{x+8}$: "Squaring, $x + 4 = x + 8$, so $4 = 8$: no solution." Find his mistake and solve the equation correctly. [2]

c. Make your own. Find a and b so that squaring $\sqrt{x+a} = x - b$ gives $x^2 - 9x + 14 = 0$. Which of its solutions is a false root? [2]

d. Show that. Show that $\sqrt{x+4} - \sqrt{x-4} = 4$ has no solution, by multiplying both sides by $\sqrt{x+4} + \sqrt{x-4}$. **[2]**

3 Long answers **[8]**

Solve the following problems. Show your working.

a. Solve $\sqrt{x+1} + \sqrt{2x+3} = 5$ and verify each answer. **[4]**

Answer:

b. A pendulum clock's pendulum takes $T = 2\pi\sqrt{L/g}$ seconds to swing there and back ($g = 9.8$ m/s^2). It should take 2 s, but it takes 2.02 s, so the clock runs slow. Should the pendulum be made longer or shorter, and by how many millimeters? **[4]**

Answer:

4 Think [2]

Think, then answer.

A student says: “I squared both sides and both answers checked, so I could have skipped the check.” Is she right? Explain.