Surds: Simplifying & Rationalising (Grade 11)

MEMORANDUM

Name: ..... Class: .....

Date: .....

MARK ____ / 34

Answer all questions. Show all your working — marks are awarded for method as well as the final answer. **Teacher copy: accept any correct equivalent method.**

1 Simplify $\sqrt{72}$ (2)

$6\sqrt{2}$ ✓✓ (2)

2 Simplify $\sqrt{50}$ (2)

$5\sqrt{2}$ ✓✓ (2)

3 Simplify $\sqrt{98}$ (2)

$7\sqrt{2}$ ✓✓ (2)

4 Simplify $\sqrt{12} + \sqrt{27}$ (2)

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

5 Simplify $3\sqrt{2} + \sqrt{50}$ (2)

$8\sqrt{2}$ ✓✓ (2)

6 Simplify $\sqrt{5} \times \sqrt{20}$ (2)

$\sqrt{100} = 10$ ✓✓ (2)

7 Expand $(\sqrt{3} + 2)(\sqrt{3} - 5)$ (3)

$-7 - 3\sqrt{3}$ ✓✓✓ (3)

8 Rationalise $\frac{6}{\sqrt{3}}$ (2)

$2\sqrt{3}$ ✓✓ (2)

9 Rationalise $\frac{1}{\sqrt{5}}$ (2)

$\frac{\sqrt{5}}{5}$ ✓✓ (2)

10 Rationalise $\frac{4}{1+\sqrt{2}}$ (3)

$-4+4\sqrt{2}$ ✓✓✓ (3)

11 Solve for x: $\sqrt{x-4}=5$ (3)

$x-4=25$ ✓; $x=29$ ✓; check: $\sqrt{25}=5$ ✓ (3)

12 Solve for x: $2\sqrt{x}+1=9$ (3)

$2\sqrt{x}=8$ ✓; $\sqrt{x}=4$ ✓; $x=16$ ✓ (3)

13 Solve for x: $\sqrt{x+6}=x$, and reject any invalid answer with a reason. (4)

$x+6=x^2$ ✓; $x^2-x-6=0$, so $(x-3)(x+2)=0$ ✓; $x=3$ or $x=-2$ ✓; $x=-2$ is rejected because $\sqrt{4}=2$, not -2, so $x=3$ ✓ (4)

14 Explain why $\sqrt{x+1}=-3$ has no solution. (2)

A square root is never negative ✓; so no value of x can make the left side equal -3 ✓ (2)

TOTAL: 34 marks

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