Exponent Laws & Exponential Equations (Grade 11)

MEMORANDUM

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

Date: .....

MARK ____ / 20

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 $16^{\frac{3}{4}}$ (2)

$(\text{4th root of } 16)^3 = 2^3 = \mathbf{8}$ ✓✓ (2)

2 Simplify 2^{-3} (1)

$\frac{1}{8}$ ✓ (1)

3 Simplify $\frac{9^n \times 3^{n+1}}{27^n}$ (3)

$3^{2n+n+1-3n} = 3^1 = \mathbf{3}$ ✓✓✓ (3)

4 Solve for x: $3^{x+2} = 81$ (2)

$3^{x+2} = 3^4 \rightarrow \boldsymbol{x = 2}$ ✓✓ (2)

5 Solve for x: $5^{2x-1} = 125$ (2)

$2x - 1 = 3 \rightarrow \boldsymbol{x = 2}$ ✓✓ (2)

6 Solve for x: $2^{2x} - 5(2^x) + 4 = 0$ (4)

Let $k = 2^x$: $(k-1)(k-4) = 0 \rightarrow \boldsymbol{x = 0}$ **or** $\boldsymbol{x = 2}$ ✓✓✓✓ (4)

7 Solve for x: $3^{2x} - 4(3^x) + 3 = 0$ (4)

$(k-1)(k-3) = 0 \rightarrow \boldsymbol{x = 0}$ **or** $\boldsymbol{x = 1}$ ✓✓✓✓ (4)

8 Simplify $8^{\frac{2}{3}}$ (2)

$(\text{cube root of } 8)^2 = 2^2 = \mathbf{4}$ ✓✓ (2)

TOTAL: 20 marks

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