Exponential relationships - practice test 1

Name: _____ Date: _____

16 questions | 42 marks | 60 minutes

Original progressive questions on exact surds, indices, graphs and exponential/logarithmic reasoning.

A scientific calculator may be used.

1. Simplify a^5a^2. [2 marks]

2. Simplify $\frac{x^9}{x^4}$ for $x \neq 0$. [2 marks]

3. Evaluate $27^{\frac{2}{3}}$. [2 marks]

4. Write $16^{-\frac{1}{2}}$ as a fraction. [2 marks]

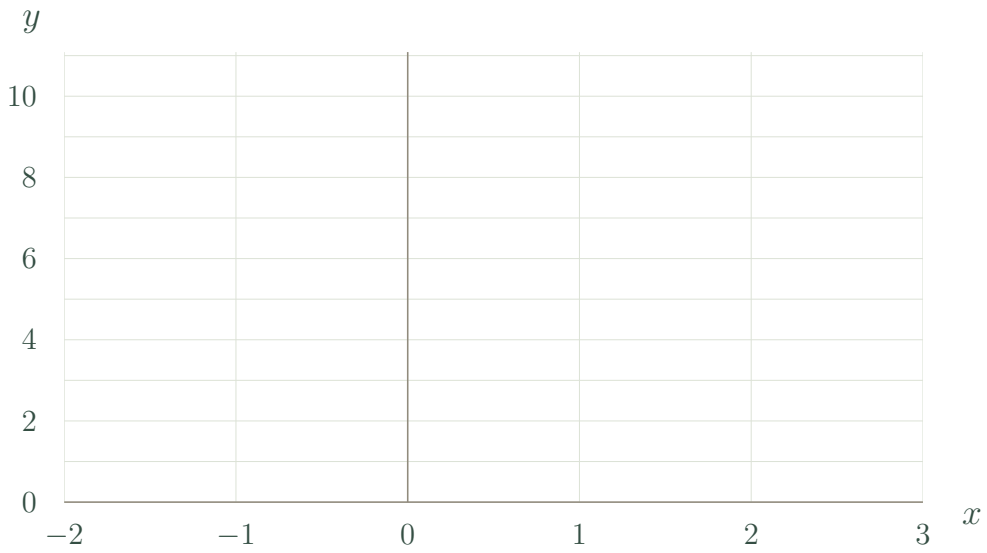
5. Simplify $\sqrt{108}$. [2 marks]

6. Simplify $2\sqrt{12} + \sqrt{27}$. [3 marks]

7. Expand $(3 + \sqrt{2})(3 - \sqrt{2})$. [2 marks]

8. Rationalise $\frac{6}{\sqrt{5}}$. [2 marks]

9. Use $y = 2^x$. [5 marks]



(a) Find the outputs at $x = -1, 0, 1, 2, 3$. [2 marks]

(b) Sketch the curve on the grid. Mark its y-intercept and state its horizontal asymptote. [3 marks]

10. A quantity begins at 250 and grows by 4% per day. Write a model using days t and find its value at $t = 2$. [3 marks]

11. Values at inputs $0, 1, 2, 3$ are $4, 12, 36, 108$. Choose a linear, quadratic or exponential model and give a rule. [3 marks]

12. Solve $8^x = 4$. [2 marks]

13. Evaluate $\log_4 64$. [2 marks]

14. Simplify $\log_3 18 - \log_3 2$. [2 marks]

15. For $y = 3(2^{x-1}) - 4$, find its horizontal asymptote and y-intercept. [3 marks]

16. A model is fitted to the data below. [5 marks]

Observed model quantity

Day t	0	1	2
N	40	60	90

(a) Find an exponential model for the three observations. [2 marks]

(b) Predict at day 3, then give one reason to be cautious about using the model at day 100. [3 marks]