Exponential relationships - practice test 2

Name: _____ Date: _____

16 questions | 47 marks | 60 minutes

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

A scientific calculator may be used.

1. Simplify $\frac{(p^4)^3}{p^5}$ for $p \neq 0$. [2 marks]

2. Evaluate $32^{\frac{3}{5}}$. [2 marks]

3. Write $\sqrt[3]{a^2}$ as a power for $a > 0$. [2 marks]

4. Simplify $\sqrt{147}$. [2 marks]

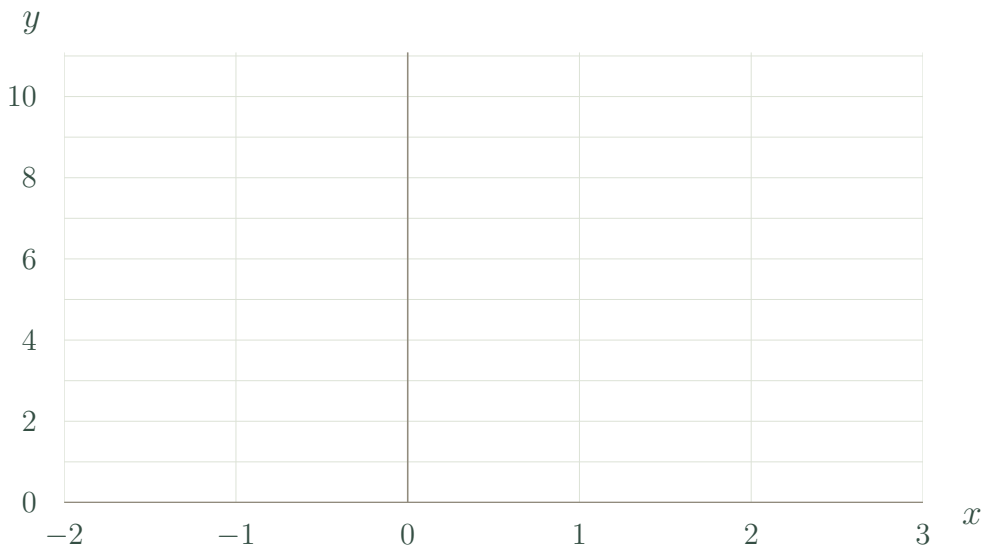
5. Simplify $(\sqrt{6}+\sqrt{2})^2$. [3 marks]

6. Rationalise $\frac{1}{4-\sqrt{7}}$. [3 marks]

7. A square has area $75\ \text{m}^2$. Find its exact perimeter. [3 marks]

8. A student rounds $\sqrt{5}$ to 2.2 before squaring. Find the exact result, the rounded result and their difference. [3 marks]

9. Consider $y = (\frac{1}{2})^x$. [5 marks]



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

(b) Sketch it on the grid and state its range. [3 marks]

10. A sample is 160 g and retains 75% of its current mass each hour. Find its mass after 3 hours. [3 marks]

11. Outputs $3, 8, 15, 24$ correspond to inputs $0, 1, 2, 3$. Use differences to identify a suitable model family. [3 marks]

12. Solve $2^{x+1} = 11$ to 3 decimal places. [3 marks]

13. Find the domain of $\log_5(2x - 6)$. [2 marks]

14. Solve $\log_2 x + \log_2 (x-2) = 3$. [4 marks]

15. Two quantities have base-10 log-scale readings 2 and 5. Find their larger-to-smaller ratio. [2 marks]

16. A graph has equation $y = a(3^x) + 2$. [5 marks]

(a) It passes through $(0, 7)$. Find a. [2 marks]

(b) Find its value at $x = 2$ and explain why consecutive output ratios are not always 3. [3 marks]