

Past-paper walk-through

Exponential Function Manipulation ■ 2.4

eXercise

Questions in this set

- 2026 Q4

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

Question 4

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Directions:

- Unless otherwise specified, the domain of a function f is assumed to be the set of all real numbers x for which $f(x)$ is a real number. Angle measures for trigonometric functions are assumed to be in radians.
- Solutions to equations must be real numbers. Determine the exact value of any expression that can be obtained without a calculator. For example, $\log_2 8$, $\cos\left(\frac{\pi}{2}\right)$, and $\sin^{-1}(1)$ can be evaluated without a calculator.
- Unless otherwise specified, combine terms using algebraic methods and rules for exponents and logarithms, where applicable. For example, $2x + 3x$, $5^2 \cdot 5^3$, $\frac{x^5}{x^2}$, and $\ln 3 + \ln 5$ should be rewritten in equivalent forms.
- For each part of the question, show the work that leads to your answers.

(a)(i) The functions g and h are given by

Question 4

$$g(x) = e^{2x}$$

$$h(x) = \log_2(5x)$$

Solve $g(x) = \frac{1}{e^6}$ for values of x in the domain of g .

(a)(ii) Solve $h(x) = 3$ for values of x in the domain of h .

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(b)(i) The functions j and k are given by

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$$j(x) = 7^{(3x+1)} \cdot 7^x$$

$$k(x) = \sin(2x) \sec x$$

Rewrite $j(x)$ as an expression of the form $7^{(\text{expression})}$.

(b)(ii) Rewrite $k(x)$ as an expression in which $\sin x$ appears exactly once and no other trigonometric functions are involved.

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(c) The function m is given by $m(x) = \tan^2(3x)$.

Find all input values for m in the interval $\left[0, \frac{\pi}{2}\right]$ that yield an output value of 1.