10 **(a)** Solve the equation $7\tan^2\theta + 5\tan\theta - 2 = 0$, for $-180° \leqslant \theta \leqslant 180°$. [4]

(b) Solve the equation $3\sin(3\phi - 1.5) - 2 = 0$, for $0 < \phi < 3$, where ϕ is in radians. [5]

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11 **(a)** The first 3 terms of an arithmetic progression are $\log_x 3$, $\log_x 81$, $\log_x 2187$. Find the sum to n terms, giving your answer in the form $k\log_x 3$, where k is in terms of n. [3]

(b) The first 3 terms of a geometric progression are 1, $3\tan^2\theta$, $9\tan^4\theta$, for $0 < \theta < \frac{\pi}{2}$.

Find the values of θ for which this geometric progression has a sum to infinity. [4]

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