Trigonometry – 2022 A2 Nov Math

1. Nov/2022/Paper_9709_21/No.3

It is given that $\sec\theta = \sqrt{17}$ where $0 < \theta < \frac{1}{2}\pi$.

Find the exact value of $\tan(\theta + \frac{1}{4}\pi)$. [4]

2. Nov/2022/Paper_9709_21/No.8

The expression $f(\theta)$ is defined by $f(\theta) = 12\sin\theta\cos\theta + 16\cos^2\theta$.

(a) Express $f(\theta)$ in the form $R\cos(2\theta - \alpha) + k$, where $R > 0$, $0 < \alpha < \frac{1}{2}\pi$ and k is a constant. State the values of R and k, and give the value of α correct to 4 significant figures. [5]

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(b) Find the smallest positive value of θ satisfying the equation $f(\theta) = 17$. [3]

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(c) Find $\int f(\theta)\, d\theta$. [2]

3. Nov/2022/Paper_9709_22/No.1

Solve the equation $\sec\theta = 5\,\text{cosec}\,\theta$ for $0° < \theta < 360°$. [4]