Higher Math Exam
Chapter: Trigonometry (8.1-8.3)

Time: 30 minutes Total Marks: 20

Answer the following questions. Each question carries 4 marks.

1. At 3:43 PM, what is the angle between the hour and minute hands of a clock?

2. A bus traveled from Dhaka to Cox's Bazar in 6 hours. Dhaka and Cox's Bazar subtend an angle of $2°56'9.47''$ at the center of the Earth. What was the average speed of the bus? (Radius of the Earth = 6400 km.)

3. If $a\sin\theta + b\cos\theta = c$, prove that $\cos\theta = \pm\dfrac{\sqrt{a^2+b^2-c^2}}{a-b\tan\theta}$.

4. Simplify the expression:
$\operatorname{cosec}\dfrac{11\pi}{90} + \sec\dfrac{\pi}{30} + \operatorname{cosec}\dfrac{101\pi}{90} + \sec\dfrac{31\pi}{30} + \sec\dfrac{10\pi}{3}$

5. Solve for θ in the equation $5\operatorname{cosec}^2\theta\tan\theta - 7\operatorname{cosec}\theta - 2\tan\theta = 0$, where $0 < \theta < 3\pi$.