Below you will find 10 problems, each worth 10 points. Solve the problems in the space provided. When writing a solution to a problem, show all work. No books or notes are allowed. Sign and submit your formula sheet with the exam.

**Problem 1.** Convert the units as indicated:

(a) 12.35° to degrees, minutes and seconds.

(b) \( \frac{7\pi}{72} \) (radians) to degrees, minutes and seconds.
Problem 2. Find two positive coterminal angles and one negative coterminal angle for each of the following angles:

(a) $-230^\circ$ (use degrees);

(b) $\frac{9\pi}{11}$ (use radians).

Problem 3. An angle $\theta$, in standard position, is located in the third quadrant and has $\cot \theta = \frac{20}{21}$. Find the exact values of $\sin \theta$ and $\cos \theta$.

Problem 4. Find the exact values of $\sin \left( -\frac{5\pi}{4} \right)$ and $\cos \left( -\frac{5\pi}{4} \right)$. 
Problem 5. Find the length of the arc that subtends the angle $100^\circ$ on a circle of diameter 18 in.

Problem 6. Prove the identity: $\sin^2 t (\csc^2 t - 1) = \cos^2 t$.

Problem 7. Find the exact values of $t$, in the interval $[-\pi, 5\pi]$, which satisfy the equation

$$\sin t = -\frac{\sqrt{2}}{2}.$$
Problem 8. Find the equation of the line that passes through the points $A(-2, 2)$ and $B(3, -8)$.

Problem 9. Find the equation of the line that passes through the point $P(2, -1)$ and is parallel to the line $3x - 4y = 7$.

Problem 10. Find the equation of the line that passes through the point $Q(-1, 2)$ and is perpendicular to the line $x - 4y = 12$. 