Closed book and closed notes. Answers must include supporting work. Calculators and cell phones out of sight.

1. (10 pts) Express the angle, $\theta = 300^\circ$, in radians and determine the values: $\sin \theta$, $\cos \theta$, and $\tan \theta$.

2. (5 pts) Express the quantity $2 \ln x + 3 \ln y - \ln z$ as a single logarithm.
3. (15 pts) Find the exact value of each expression.

a) \( \log_8 2 \)  

b) \( \log_5 \frac{1}{125} \)  

c) \( e^{\ln 4.5} \)  

d) arctan 1  

e) \( \tan(\arctan 10) \)

4. (10 pts) Find the domain of \( f(x) = \ln(6 - x - x^2) \).
5. (15 pts) Find all $x$ that satisfy the equation.

a) $2\cos x - 1 = 0$ for $x$ in the interval $[0, 2\pi]$.

b) $e^{7-4x} = 6$

c) $e^{xe} = 10$

6. (10 pts) Simplify the expression $\sin(\tan^{-1} x)$. 

7. (10 pts) Sketch the following graphs labeling the x-intercepts and all asymptotes.

a) \( y = 1 - 2^{-x} \)

b) \( y = \tan \left( x - \frac{\pi}{2} \right) \) on \([0, 2\pi]\)

8. (10 pts) Find each x-value at which \( f \) is discontinuous. Explain your answer fully using left and right-hand limits.

\[
f(x) = \begin{cases} 
x + 2 & \text{if } x < 0 \\
2x^2 & \text{if } 0 \leq x \leq 1 \\
3 - x & \text{if } x > 1 
\end{cases}
\]
9. (15 pts) Find the following limits:

a) \( \lim_{x \to 3} \frac{x^2 - 9}{x^2 - x - 6} \)

b) \( \lim_{x \to 4} \frac{x^2 - 16}{|x - 4|} \)

c) \( \lim_{h \to 0} \frac{\sqrt{9 + h} - 3}{h} \)