Please use lots of space and explain your answers, showing clearly any work you had to do. Each question is worth 3 points.

(1) Solve the logarithmic equation: $\log_2(3x + 1) = \log_2(x + 9)$

(Hint: use that $\log_b(x)$ is one-to-one so that if $\log_b(x) = \log_b(y)$ then $x = y$.)

(2) Solve the logarithmic equation: $\ln(x + 3) = \ln(4x - 9)$

(Check your answer works - logs only take positive inputs.)

(3) Solve : $\log_4(3) + \log_4(x - 1) = \log_4(x + 7)$

(Combine the logs on the left into a single log using $\log_b(x) + \log_b(y) = \log_b(xy)$.)

(4) Solve : $2 + \log_3(x) = \log_3(3x + 2)$

(Hint: write 2 as $\log_3(something)$.)

(5) Solve : $\log_4(x) + \log_4(x - 3) = 1$

(6) Draw $150°$ in standard position and say which quadrant the terminal side is in.

(7) Convert $150°$ to radians as follows:

   (a) Give the simplified exact answer involving π.

   (b) Then give the inexact answer as a decimal (it should be between 2 and 3).

(8) Draw $-\pi/4$ radians in standard position and say which quadrant the terminal side is in.

(9) A circle has radius 9 cm.

   (a) Find the length of the arc of this circle corresponding to a central angle of $\pi/6$ radians.

   (b) Find the area of a sector of this circle corresponding to a central angle of $\pi/6$ radians.

   (Hint: Use the arc length and sector area formulas. Make sure your answers have the correct length and area units.)

(10) Suppose $\cos(t) < 0$ and $\sin(t) < 0$. Which quadrant is the terminal side of this angle in?

If you get stuck on a question or aren't sure if you understand it:

- Go over the relevant class notes and section in the textbook.

- Check if you get the right answer for a similar odd-numbered question in the textbook (answers at the back of the book).

- Ask me about it after class.

- Come to my office hours: Mon 12:00 - 1:00, Wed 12:00 - 1:00 in CP 317.

- Go to the Math Tutorial Lab in-person in CP 303 or online.