

INSTRUCTIONS: **Simplify** and **box** all your answers. Write neatly and **show all work**. A correct answer with incorrect or no supporting work may receive no credit. Books, notes, electronic devices (such as calculator or unauthorized electronic resources) are not permitted. **Give all answers in exact form.**

1. Write the word “agree” as your answer to question 1 to indicate that you will abide by the University honor code for this exam. An honor code violation on this exam may result in a zero on the exam or an F in the course.

2. Sketch the following graphs. Be sure to label any asymptotes and x, y -intercepts on your axes. (12 pts)

(a) $y = -\left(\frac{2}{3}\right)^x$

(b) $y = \ln(x - 1)$

3. The following are unrelated: (12 pts)

(a) Use the properties of logs to simplify the expression: $\log_3(54) - \log_3(2) + \log_3(1) + \log_3(9^x)$.

(b) Express in terms of sums and differences of logarithms without exponents: $\ln\left(\frac{e^2}{x^3\sqrt{y}}\right)$

4. Solve the following equations. Leave answers in exact form.

(a) $3 = \log(2x - 1)$ (6 pts)

(b) $4^{3x+1} = 4^{x-1}$ (6 pts)

(c) $\log_2(x) + \log_2(x + 12) = \log_2(28)$ (6 pts)

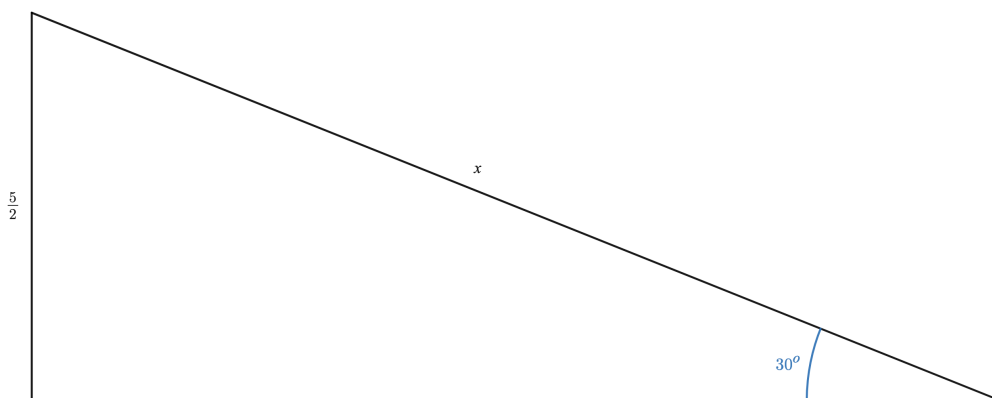
(d) $10 = 2e^{4x}$ (6 pts)

5. Sketch each angle, θ , in standard position on the x, y -axes. Give a separate graph for each.

(a) $\theta = -\frac{5\pi}{6}$ (5 pts)

(b) $\theta = \pi$ (5 pts)

6. Use the image of the triangle to solve for x . (6 pts)



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7. Find the following:

(a) $\sin\left(\frac{7\pi}{4}\right)$ (5 pts)

(b) $\cos\left(\frac{2\pi}{3}\right)$ (5 pts)

(c) $\tan(-120^\circ)$ (5 pts)

(d) $\sec\left(\frac{\pi}{3}\right)$ (5 pts)

8. Evaluate: $\cos^2(25.1^\circ) + \sin^2(25.1^\circ)$ (5 pts)

9. Given $\tan\theta = \frac{2}{3}$ and θ in quadrant III find:

(a) $\cot\theta$ (5 pts)

(b) $\cos\theta$ (6 pts)

End of Exam. Formula sheet follows.

Potentially useful formulas:

(a) Let u and w denote positive real numbers, then:

i. $\log_b(uv) = \log_b(u) + \log_b(v)$

ii. $\log_b\left(\frac{u}{v}\right) = \log_b(u) - \log_b(v)$

iii. $\log_b(u^c) = c \log_b(u)$ where c is any real number.

iv. $\log_b(u) = \frac{\log_a(u)}{\log_a(b)}$

(b) $A = \frac{1}{2}r^2\theta$

(c) $S = r\theta$

(d) $\sin^2\theta + \cos^2\theta = 1$

(e) $\tan^2\theta + 1 = \sec^2\theta$

(f) $1 + \cot^2\theta = \csc^2\theta$