Practice Final Exam

1. Find the domain of the following

$$f(x) = \frac{2x^2 + 5x - 3}{2x^2 - 5x - 3}$$

Write your answer as a union of intervals

2. Find the center and raidus of $x^2 + y^2 + 6x - 8y = 0$.

3. Solve for x

   - $\ln \ln(x) = 1$
   - $\frac{1}{e^{7-4x}} = 6$

4. Suppose a colony of bacteria starts with 100 cells and triples in size every two hours.
   - Find a function that models the population growth of this colony of bacteria.
   - How many cells are in the colony after 4 hours?

5. Suppose $\frac{-\pi}{2} < \theta < 0$ and $\cos\theta = \frac{5}{6}$. Find $\sin\theta$ and $\tan\theta$.

6. (Consider figure 1). Find the value of b if $a = 2, v = \frac{2\pi}{3}$ and the area of the parallelogram equals $2\sqrt{3}$.

7. Simplify the following as much as possible.

   - $\cot x \tan x$
   - $\tan^2 x - \sec^2 x$
   - $\frac{(1-\sin x)(1+\sin x)}{\cos x}$

8. Refer to the figure 2. A triangle has side $c = 2$ and angles $A = \frac{\pi}{4}$ and $B = \frac{\pi}{3}$. Find the length of a opposite A, and find the area of the triangle.

9.

- Sketch $\sin x$ on the interval $[-2\pi, 2\pi]$
- Sketch $3\sin 2x - 1$ on the interval $[-2\pi, 2\pi$ and find the range, period and domain.