Math 10a  Homework Assignment on Precalculus Material

Due Dates
• Sections that meet TTh: due Tue, Sep 5
• Sections that meet TF: due Tue, Sep 5
• Sections that meet MW: due Wed, Sep 6
• Sections that meet MWTh: due Wed, Sep 6

Important! Knowledge of precalculus is a prerequisite for Math 10a. The problems in this assignment represent the precalculus material that we expect you to know. This is material that will be used regularly throughout the course, and will be tested explicitly on the first exam.

Writing up homework: Your homework must
• be written up neatly on a separate sheet of paper (i.e., not on this handout);
• have problem numbers clearly labeled; and
• be stapled (if you have multiple sheets of paper).

Do not use a calculator. SHOW ALL YOUR WORK. Carefully label the axes of any graphs you draw.

1. Evaluate $16^{-\frac{3}{4}}$.

2. Find the solutions (if any) to each of the following equations.
   (a) $x^2 + x = 4$
   (b) $\frac{1}{x^2 - 5x - 14} = 0$
   (c) $x^3 = 9x$

3. Find the equation of the line that passes through the point $(2, -1)$ and is perpendicular to the line shown below.

4. Let $f(x) = \frac{2}{x}$. Find $\frac{f(x+a) - f(x)}{a}$ and simplify as much as possible. (Your answer will contain $a$.)

5. Write the following set using interval notation: \{ $x : x \geq -1$ \}.

6. Let $f(x) = \frac{x^2 - 7}{x^2 - 16}$.
   (a) Find the domain of $f(x)$.
   (b) Find the $x$- and $y$-intercepts of $f(x)$.

   OVER FOR REST OF ASSIGNMENT
7. Let \( f(x) = \begin{cases} \frac{1}{x}, & \text{if } x > 0 \\ -2x + 3, & \text{if } x \leq 0 \end{cases} \).

(a) Find \( f(-1), f(0) \) and \( f(4) \).

(b) Make a careful sketch of the graph of \( f(x) \).

8. Let \( h(x) = e^{\sin x + 4} \). Find two functions \( f(x) \) and \( g(x) \) such that \( f(g(x)) = h(x) \).

9. Evaluate the following. No calculators!

(a) \( \log_\frac{1}{2} \frac{1}{8} \)

(b) \( \log(.001) \)

(c) \( \ln e \)

(d) \( \ln \sqrt{e} \)

(e) \( \ln 1 \)

(f) \( e^{\ln 7} \)

10. Make a careful sketch of the graph of the function \( f(x) = \ln x \). Label at least three points on your graph (do not use a decimal approximation for any of your points).

11. Find the solutions (if any) to each of the following equations.

(a) \( e^{2+3x} = 5 \)

(b) \( e^{2x} - 6e^x = 0 \)

(c) \( 3 \ln x = -1 \)

(d) \( \ln x(\ln x - 4) = 0 \)

12. Evaluate the following. No calculators! All angles are in radians.

(a) \( \sin \frac{5\pi}{6} \)

(b) \( \cos(-\frac{7\pi}{6}) \)

(c) \( \csc \frac{9\pi}{4} \)

(d) \( \cot \pi \)

13. Find the values of \( \theta \) in the interval \([0, 2\pi]\) which make the following equation true:

\( \sin \theta = -\frac{\sqrt{3}}{2} \).

14. Make a careful sketch the graph of the function \( f(x) = 2\cos x + 2 \). Your graph should extend from \( x = -2\pi \) to \( x = 2\pi \).

15. Which of the following is the graph of \( f(x) = e^{-x} + 1 \)?

Graph 1

Graph 2

Graph 3