All questions except number 1,5 come from the course text.

1. This question consist on a few short multiple choice questions on precalc to discuss.

   (a) Given the equation of a line $y = mx + b$, m is called the:
   ◯ asymptote ◯ slope ◯ multiplier ◯ x-intercept ◯ y-intercept

   (b) The lines $y = m_1x + b_1$ and $y = m_2x + b_2$ are *parallel* if:
   ◯ $m_1 = m_2$ ◯ $m_1m_2 = -1$ ◯ $m_1m_2 = 1$ ◯ $b_1 = -b_2$ ◯ $m_1b_2 - b_1m_2 = 0$
   What about *perpendicular*?

   (c) The maximum of $-2x^2 + 12x + 10$ is attained for:

   ◯ $x = 3$
   ◯ $x = 3 \pm \sqrt{14}$
   ◯ $x = 0$
   ◯ $x = 28$
   ◯ x in the middle of the two x-intercepts

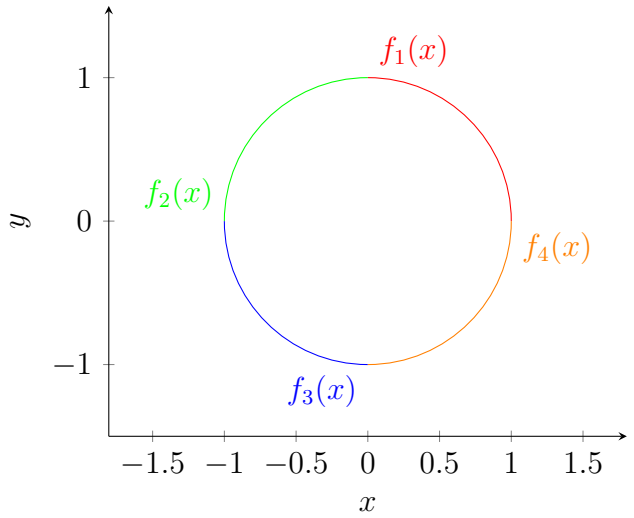
   Can you recall how to determine if quadratic has a maximum/minimum? What's the quadratic formula?

   (d) Which of the following assertion is true?
   ◯ $\ln(x + y) = \ln(x) + \ln(y)$ ◯ $e^{xy} = e^xe^y$ ◯ $2^x + 2^x = 2^{x+1}$ ◯ $f^{-1}(x) = \frac{1}{f(x)}$

2. Let $f(x) = \sqrt{x + 2}$ for $x \geq -2$. Find the inverse of $f(x)$ for $x \geq -2$ and write it in the form $y = f^{-1}(x)$. Then, verify the relationships $f(f^{-1}(x)) = x$ and $f^{-1}(f(x)) = x$.

3. The unit circle $x^2 + y^2 = 1$ consists of four one-to-one functions, $f_1(x), f_2(x), f_3(x)$, and $f_4(x)$ (see figure).

   1. Find the domain and a formula for each function.
   2. Find the inverse of each function and write it as $y = f^{-1}(x)$.



4. Solve the following equations:

   - $\log_{10} x = 3$.
   - $\log_8 x = \frac{1}{3}$.

- $\ln x = -1$.

5. Without using a graphing utility, sketch the graph of $y = 2^x$. Then on the same set of axes, sketch the graphs of $y = 2^{-x}, y = 2^{x-1}, y = 2^x + 1$, and $y = 2^{2x}$.

6. (*) A particular factory produces organic, artisanal garbage; denote by x the number of units of garbage the factory produces in a given day.

   1. Suppose the total cost to the factory of producing x units a day is $C(x) = 36x + 260$ dollars, and that the total projected revenue from producing x units a day is $R(x) = -2x^2 + 104x - 220$. Find the projected daily profit from producing x units per day.
   2. Determine the number of units of artisanal garbage the factory should produce each day to maximize its profit.

7. (*) Prove that, if $b > 0, c > 0, b \neq 1, c \neq 1$, then $(\log_b c)(\log_c b) = 1$.

8. Sketch a function that is one-to-one and positive for $x \geq 0$. Make a rough sketch of its inverse.

9. Solve the equation $3^{3x-4} = 15$