PROBLEM SET 1B

1. $15^{2x+1} = 17^{x+1}$

2. Find all values of $x$ in the interval $[0, 2\pi]$ which satisfy the inequality. Write your solution as a union of intervals.

\[ \sin x \leq 0.5 \]

3. Find the domain of the function. Express your answer in interval notation.

\[ f(x) = \ln \left( x - \frac{x^2 - 21}{x + 7} \right) \]
4. Sketch the graph (include 2 full periods) of the function. Find the exact value of all $x$-intercepts.

$$y = 2 \cos(\pi x - \frac{\pi}{4})$$

5. Find the domain of the function.

$$f(x) = \frac{2x^2 + 5x - 3}{2x^2 - 5x - 3}$$
6. Find the exact values of all solutions $x$ in the interval $[0, 2\pi)$ to the equation.

$$\sec^2 x - 6\tan x + 4 = 0$$

7. Find the domain and range of the function, and sketch it. Indicate the $x$ and $y$-intercepts on the graph.

$$f(x) = \sqrt{x + 4}$$
ANSWERS.

1. \(\frac{\ln 17 - \ln 15}{2\ln 15 - \ln 17}\)

2. \([0, \frac{\pi}{6}] \cup \left[\frac{5\pi}{6}, 2\pi\right]\)

3. \((-\infty, -7) \cup (-3, \infty)\)

4. \(n - \frac{1}{4}\) for integers \(n\).

5. \((\infty, -\frac{1}{2}) \cup \left(\frac{1}{2}, 3\right) \cup (3, \infty)\)

6. \(\frac{\pi}{4}, \frac{5\pi}{4}\)

7. Domain: \([-4, \infty)\), range: \([0, \infty)\), intercepts: \((0, 2), (-4, 0)\)