Math 141 - Homework 2 **Name:** _____

Find all solutions to the following equations.

1. $x^2 + 2x = 15$

2. $x^3 + 3x = 4x^2$

Find the roots of the following polynomials.

3. $2x - x^3$

4. $\frac{1}{3}x^2 - 1$

5. Let $f(x) = x^2$. Draw a graph of the function $9 - f(x)$.

6. Let $g(x) = \sqrt{x}$. Draw a graph of the function $g(x + 4)$.

7. Graph the piecewise function $f(x) = \begin{cases} 4x + 3 & \text{if } x \leq 0 \\ 1 - x & \text{otherwise.} \end{cases}$

8. Convert the following angles from radians to degrees or degrees to radians.

   (a) 75°

   (b) $\frac{11}{6}\pi$ radians

9. Let $f(x) = \sqrt{x}$ and $g(x) = |x + 1|$.

   (a) Find a simplified formula for $(f \circ g)(x)$.

   (b) Find a simplified formula for $(g \circ f)(x)$.

   (c) Find the domain of $(f \circ g)(x)$.

   (d) Find the domain of $(g \circ f)(x)$.

10. Let $f(x) = x^3$ and $g(x) = \dfrac{1}{x + 8}$.

    (a) Find a simplified formula for $(f \circ g)(x)$.

    (b) Find a simplified formula for $(g \circ f)(x)$.

    (c) Find the domain of $(f \circ g)(x)$.

    (d) Find the domain of $(g \circ f)(x)$.

11. Evaluate the following.

    (a) $\cos\left(\frac{4\pi}{3}\right)$ (b) $\tan\left(\frac{19\pi}{4}\right)$ (c) $\sin\left(-\frac{3\pi}{4}\right)$ (d) $\sec\left(\frac{\pi}{6}\right)$

For each of the following equations, find all solutions in the interval $0 \leq \theta < 2\pi$.

12. $2\sin\theta - 1 = 0$

13. $2\tan^2\theta = 2$

14. $2\cos\theta\sin\theta = \sin\theta$