1. Solve \((x - 3)(x + 2) \geq 0\). Write your answer in interval notation.

2. Find the center and radius of the circle \(x^2 + y^2 - 5y + 6 = 0\).

3. Consider the function \(f(x) = \frac{x}{x^2 - 1}\). Give
   (a) the domain of \(f\);
   (b) any intercepts;
   (c) any vertical asymptotes of \(f\);
   (d) any horizontal asymptotes of \(f\);
   (e) and a sketch of the graph of \(f\).

4. Consider the function \(f(x) = 2x^4 - 8x^2\). Give
   (a) any intercepts;
   (b) all zeros with the multiplicity;
   (c) and a sketch of the graph of \(f\).

5. A 1 week-old sorghum plant has an average height of 2 inches. A 4 week-old sorghum plant has an average height of 8 inches. Assuming that the growth is linear,
   (a) find an equation for the height of an average sorghum plant as a function of time;
   (b) and use part (a) to predict how tall a 5 week-old plant will be.

6. Describe how the graph of \(4f(x - 2) + 3\) is related to the graph of \(f(x)\).

7. Solve \(2^{x^2+3} = 16\).

8. Solve \(\log_2(x) + \log_2(x - 15) = 4\).

9. Suppose you have 100 linear feet of fence to enclose three sides of a rectangular flower bed; the fourth side is your house. Determine the dimensions that will yield the greatest area. **Draw a figure** to describe the scenario and **clearly** label the length and the width.
10. Give exact values for the following
   (a) $\tan(60^\circ)$
   (b) $\cos\left(-\frac{3\pi}{4}\right)$
   (c) $\arcsin\left(-\frac{1}{2}\right)$
   (d) $\sin\left(\arctan\left(\frac{1}{3}\right)\right)$

11. Find all values of $x$ in radians, $0 \leq x < 2\pi$, that satisfy $\sin(2x) = \cos(x)$.

12. Convert the point $\left(2, \frac{3\pi}{4}\right)$ from polar coordinates to rectangular coordinates.

13. If $\cos(x) = \frac{3}{5}$, find $\cos(2x)$.

14. If $\theta$ is an angle in the fourth quadrant and $\cos(\theta) = \frac{5}{13}$, find exact values for the remaining five trigonometric functions.

15. If $\mathbf{u} = \langle 2, -3 \rangle$ and $\mathbf{v} = \langle 3, 4 \rangle$,
   (a) find $3\mathbf{u} - \frac{1}{2}\mathbf{v}$;
   (b) find the magnitude of $\mathbf{u}$;
   (c) and express $\mathbf{v}$ in terms of unit vectors.

16. Solve the following system
   
   $2m - 3n = -2$
   $4m + n = 24$.

17. Find the partial fraction decomposition for $\frac{8x - 1}{x^2 - x - 2}$.

18. Consider the following geometric series
   
   $4 + \frac{4}{3} + \frac{4}{9} + \frac{4}{27} + \ldots$.
   (a) Express the above geometric series using sigma notation.
   (b) Determine whether the sum exists for the geometric series. Justify your answer.