

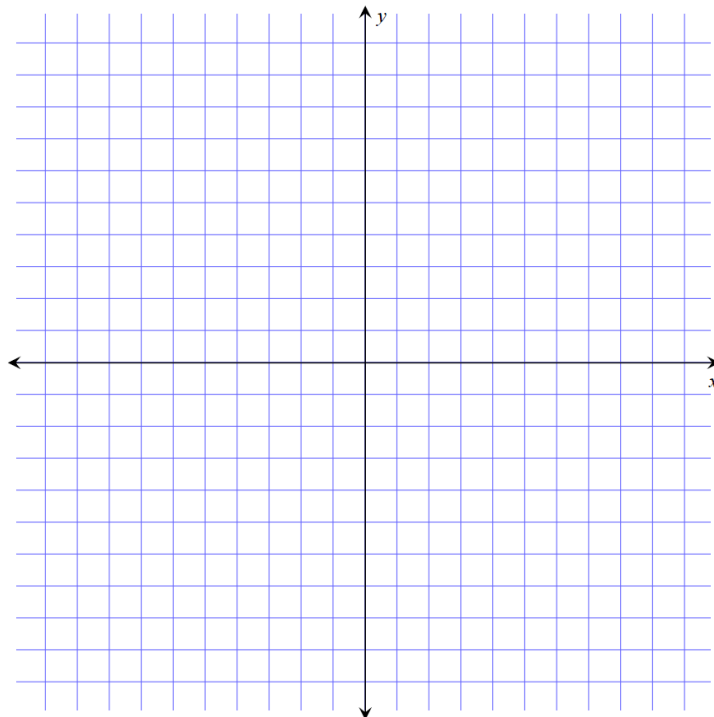
{10 pts.} 1. Consider the circle whose equation is $x^2 + 6x + y^2 - 8y = 0$.

(a) Find the center and radius of this circle.

(b) What is the area of this circle?

(c) Does the origin lie on this circle? Why or why not?

(d) Sketch the graph of this circle.



{15 pts.} 2. Find and simplify the difference quotient of $f(x) = 7x - x^2$.

{15 pts.} 3. (a) Find the domain of the function $g(x) = \frac{1}{2x - 10}$.

(b) Find the domain of the function $h(x) = \sqrt{2x - 10}$.

{20 pts.} 4. Let $f(x) = x^2 - x - 6$.

(a) Find and simplify $f(x - 4)$.

(b) Find and simplify $f(x) - f(4)$.

(c) Find the x - and y -intercepts of the graph of $y = f(x)$.

(d) Find all x for which $f(x) = -4$.

{10 pts.} 5. Find all x that satisfy $|5 - x| \leq 7$. Write your answer in interval notation.

{15 pts.} 6. Solve the inequality $\frac{2}{x-1} \geq \frac{3}{x+2}$. Write your answer in interval notation.

{15 pts.} 7. Let $g(x) = \frac{2x + 8}{x - 3}$.

(a) Evaluate $g(-5)$.

(b) Find the x - and y -intercepts of the graph of $y = g(x)$.

(c) Find and simplify $g\left(\frac{3}{x+2}\right)$.

{2 pts.} **Extra Credit.** Let $f(x) = -x^3(x - 1)^3$. Find and simplify $f(x^2) + f(x) \cdot f(x + 1)$.

{2 pts.} **Extra Credit.** Solve for x :

$$x = 1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{x}}}$$