

Please show all work and **box your final answers**. If you need more room, you may use the backs of the pages. Calculators are not allowed and cellphones should be put away. Good luck!

1. (4 points) Find the x - and y -intercepts of the graph of the equation

$$y^2 - 2xy + 4x = 1.$$

2. (4 points) Give an equation for the circle with center $(5, -1)$ and radius 2.

3. (6 points) Find the center and radius of the circle with the equation

$$x^2 + y^2 + 4x - 6y = 23.$$

4. (4 points) Find the slope of the line that passes through the points $(-1, 2)$ and $(4, -3)$.

5. Give an equation for the line that passes through the point $(3, -1)$ and is...

(a) (4 points) horizontal.

(b) (4 points) vertical.

(c) (4 points) perpendicular to the line $2x + 5y + 8 = 0$.

6. (8 points) Find the domain of the function

$$g(x) = \frac{\sqrt{2+x}}{x^2 - 3x}.$$

7. (8 points) Let $f(x) = \frac{2x}{x-1}$. Find and simplify the difference quotient $\frac{f(a+h) - f(a)}{h}$.

8. (8 points) Graph the following piecewise defined function on the axes below.

$$f(x) = \begin{cases} x + 7 & \text{if } x \leq -2 \\ x^2 & \text{if } -2 < x \leq 1 \\ 2 & \text{if } 1 < x \end{cases}$$

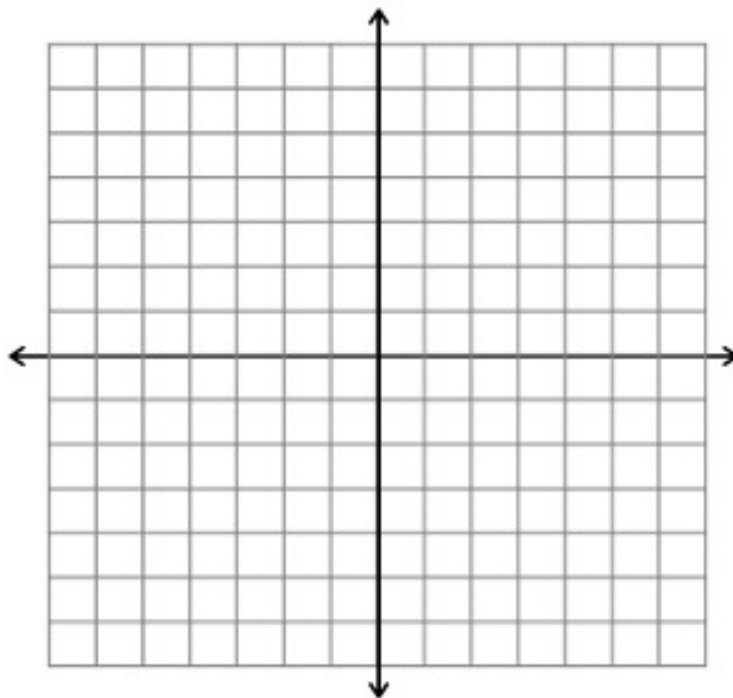


Figure 1: $y = f(x)$

9. (4 points) Circle the curves below that are the graph of a function of x .

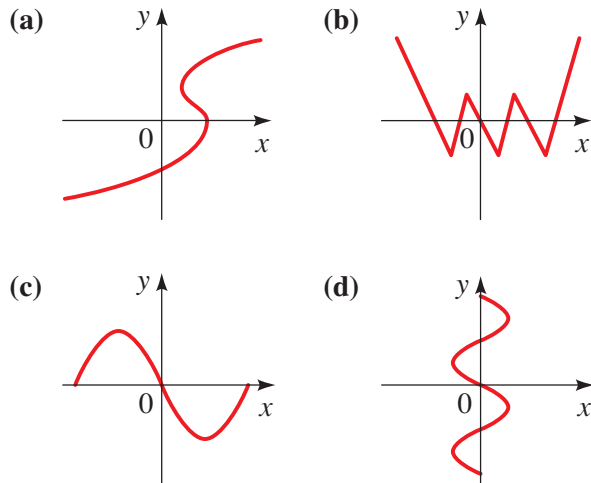


Figure 2: