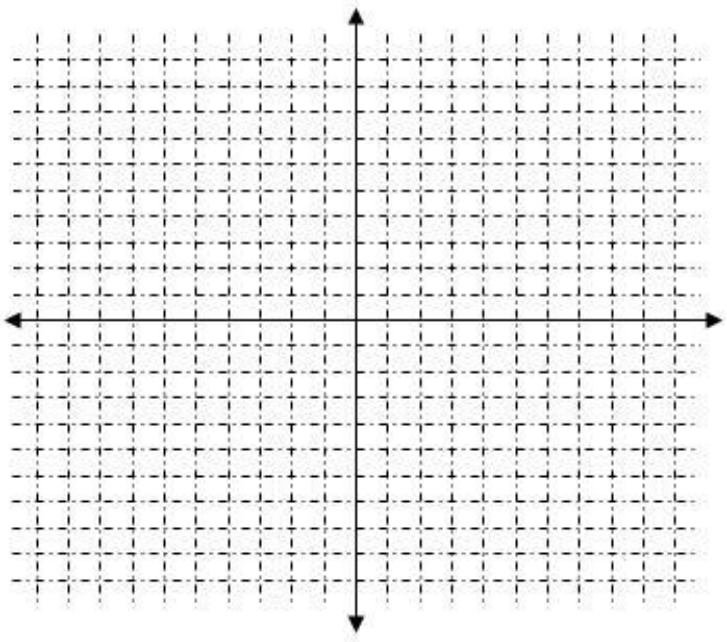
1. Let $P_1 = (5, -3)$, $P_2 = (-7, 2)$, and $P_3 = (1, 3)$.

   (a) Find the equation of the line containing the points P_1 and P_2 in slope-intercept form.

   (b) Find the equation of the line perpendicular to the one you found in part (a) that contains P_3. Once again, write the equation in slope-intercept form.

   (c) Graph both lines you found in parts (a) and (b) on the axis. Be sure to label points P_1, P_2, and P_3 on your graph.

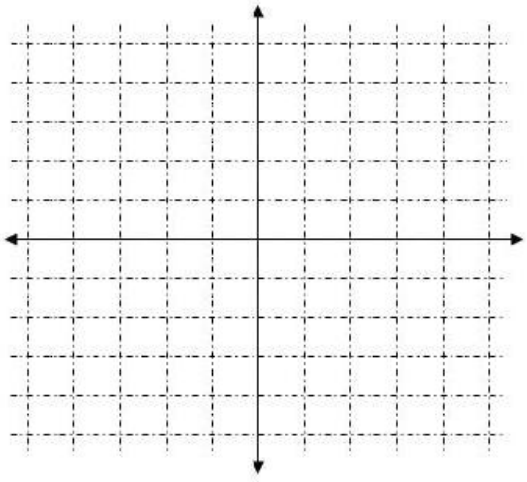


2. Consider the equation of a circle in general form $x^2 + y^2 - 3x + 2y - 3 = 0$.

   (a) Rewrite this equation in standard form, and identify the center and radius of the circle.

   (b) Find all intercepts of the circle.

   (c) Draw the circle on the axis. Label the center and the y-intercepts.



3. Let $f(x) = \dfrac{4x}{x^2 - 1}$.

   (a) Evaluate $f(3)$.

   (b) Evaluate $f(x + 1)$.

   (c) What is the domain of f?

   (d) Determine algebraically whether or not f is even, odd, or neither.

4. For the function $F(x) = \dfrac{x}{x - 3}$, evaluate the difference quotient $\dfrac{F(x + h) - F(x)}{h}$.

5. Let $f(x) = \dfrac{3}{\sqrt{2-3x}}$ and $g(x) = \dfrac{\sqrt{x}}{\sqrt{2-3x}}$.

(a) Find the domain of both functions f and g.

(b) Evaluate $(f+g)(x)$, and find the domain of $f+g$.

(c) Evaluate $(f \cdot g)(x)$, and find the domain of $f \cdot g$.

(d) Evaluate $\left(\dfrac{f}{g}\right)(x)$, and find the domain of $\dfrac{f}{g}$.

6. Let $f(x) = -16x^2 + 48x + 80$.

   (a) Find the average rate of change in $f(x)$ from 3 to x (assuming that $x > 3$).

   (b) Using your answer from part (a), find the slope of the secant line containing the points $(3, f(3))$ and $(5, f(5))$.

   (c) Find the equation of this secant line in slope-intercept form.

7. The points $(1, 3)$ and $(5, 5)$ are opposite each other on a circle. Write the equation of that circle in standard form. (Hint: A rough sketch might be helpful.)

8. Consider the following piecewise function:

$$f(x) = \begin{cases} -x - 2 & \text{if } x < -3 \\ x & \text{if } -3 \leq x < 2 \\ -2x + 10 & \text{if } x \geq 2 \end{cases}$$

Graph this function on the axis.