
Give complete solutions to the following problems be sure to provide all the necessary steps to support your answers.

1. Solve the inequality and graph the solution. Be sure to include a sign chart in your solution.

$$x^2 \geq 9$$

2. Solve the inequality and graph the solution. Be sure to include a sign chart in your solution.

$$x^2 - x - 12 \geq 0$$

3. Solve the inequality and graph the solution. Be sure to include a sign chart in your solution.

$$(x - 1)^2 > 16$$

4. Solve the inequality and graph the solution. Be sure to include a sign chart in your solution

$$\frac{2}{x+5} \geq \frac{1}{x-3}$$

5. Find all vertical asymptotes of the graph of the function $y = f(x)$ then use a sign chart to determine the behavior of f on each side of the vertical asymptotes.

$$f(x) = \frac{1}{x-2} + \frac{x}{x^2-9}$$

6. Use the position equation $s = -16t^2 + v_0t + s_0$, where s represents the height of an object (in feet), v_0 represents the initial velocity of the object (in feet per second), s_0 represents the initial height of the object (in feet), and t represents the time (in seconds). A projectile is fired straight upward from ground level ($s_0 = 0$) with an initial velocity of 224 feet per second.

- a. At what instant will it be back at ground level?
- b. When will the height exceed 768 feet