

## 2.8 Solve Inequalities in One Variable

### ESSENTIAL QUESTIONS

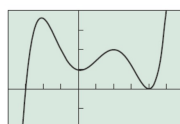
1. How is a sign chart used to determine where a function is zero, positive, or negative?
2. Why is it important to check your solutions to radical or rational equations or inequalities?

Determine intervals (values of  $x$ ) on which  $f(x) > 0$  or  $f(x) < 0$

Graphically, what does this mean?

$f(x) > 0 \Rightarrow$  the graph lies above the  $x$ -axis  
(the  $y$ -coordinates of every point are positive)

$f(x) < 0 \Rightarrow$  the graph lies below the  $x$ -axis  
(the  $y$ -coordinates of every point are negative)



Give the intervals for  $x$  on which  $f(x) > 0$  and  $f(x) < 0$ .

$$f(x) = (x+3)(x^2+1)(x-4)^2$$

Use sign charts to determine intervals on which  $f(x) > 0$  or  $f(x) < 0$ .

1. Identify all zeros and vertical asymptotes.
2. Create a sign chart.
3. Specify the intervals on which  $f(x) > 0$  and  $f(x) < 0$ .

examples...

1. On what intervals is  $f(x)$  positive and negative?

$$f(x) = (x-1)^2(x+2)^3(x-5)$$

zeros:



Try this:

2. On what intervals is  $f(x)$  positive and negative?

$$f(x) = -6(x+3)(x-4)^2$$

3. Solve:  $(x^2+1)(2x^2+5) > 0$ .

4. Solve:  $\frac{5}{x+3} + \frac{3}{x-1} < 0$

5. Solve:  $(x-3)\sqrt{x+1} \geq 0$

Because of the square root, we have to look at the domain before we begin!