

Polynomial and Rational Inequalities

A **polynomial inequality** is an inequality that can be put in one of the following forms:

$$f(x) < 0, f(x) > 0, f(x) \leq 0, f(x) \geq 0 \quad (\text{where } f \text{ is a polynomial})$$

A **rational inequality** is similar, except f is a rational function instead.

Ex 1.

Solve and graph: $x^2 - x > 20$

Ex 2.Solve and graph: $x^3 + 3x^2 \leq x + 3$ **Ex 3.**Solve and graph: $\frac{x-5}{x+2} \leq 0$

Ex 4.Solve and graph: $\frac{x+1}{x+3} \geq 2$

Practice

1. Solve and graph: $x^2 \geq 2x + 3$

2. Solve and graph: $\frac{x+5}{x+2} < 0$

3. Solve and graph: $3x^2 + 16x < -5$

4. Solve and graph: $\frac{11+x}{6-2x} \geq 1$

Q: A bus driver was heading down a street in Walnut. He went right past a stop sign without stopping, went the wrong way on a one-way street, and then went on the left side of the road past a cop car. The cop did nothing, because he didn't break any traffic laws. Why not?