

Problem 8 (10 points). If $f(x) = (x-1)(x-2)(x-4)$ and $g(x) = -5x + 5$.
 For what values of x is it true that $f(x) < g(x)$?

$$(x-1)(x-2)(x-4) < -5(x-1)$$

$$(x-1)(x^2 - 6x + 8) + 5(x-1) < 0$$

$$(x-1)(x^2 - 6x + 13) < 0$$

we want

$$\text{if } x^2 - 6x + 13 = 0$$

$$x = \frac{6 \pm \sqrt{36 - 4(1)(13)}}{2}$$

$$= \frac{6 \pm \sqrt{36 - 42}}{2} = \frac{6 \pm \sqrt{-6}}{2} \quad \text{no real solutions}$$

$$f(x) = (x-1)(x^2 - 6x + 13)$$

