

Philosophy: Looking for understanding by the end. And I want balance in my life. *Want better self-learners.*

Test 2: Some sort of makeup, later, for $\frac{1}{3}$ of the points you missed.

§3.1 Questions?

81 $2x+15 < x^2$

Mistake $+x^2$ on the solutions.

$-x^2+2x+15 < 0$

$0 < x^2-2x-15$

$a=-1, b=2, c=15$

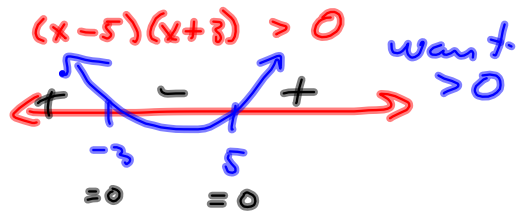
$x^2-2x-15 > 0$

$b^2-4ac = 2^2-4(-1)(15)$

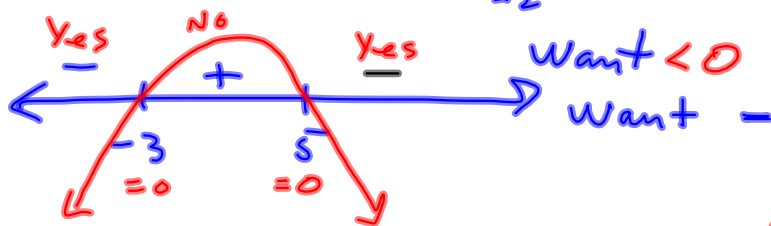
$= 4+60 = 64$

$x = \frac{-2 \pm \sqrt{64}}{2(-1)} = \frac{-2 \pm 8}{-2}$

$\frac{6}{-2} = -3$
 $\frac{-10}{-2} = 5$



$(-\infty, -3) \cup (5, \infty)$



$-x^2$



$(-\infty, -3) \cup (5, \infty)$

$$\underline{x^2 - 5x - 11 > 0}$$

$$a=1, b=-5, c=-11$$

$$b^2 - 4ac = (-5)^2 - 4(1)(-11)$$

$$= 25 + 44$$

$$= 69$$

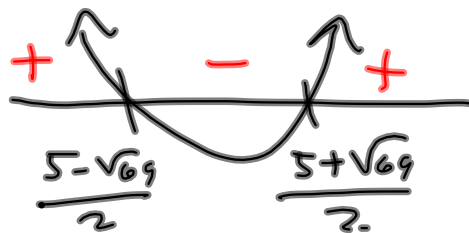
$$x = \frac{5 \pm \sqrt{69}}{2(1)}$$

$$= \frac{5 \pm \sqrt{69}}{2}$$

$$(-5)^2 = 25$$

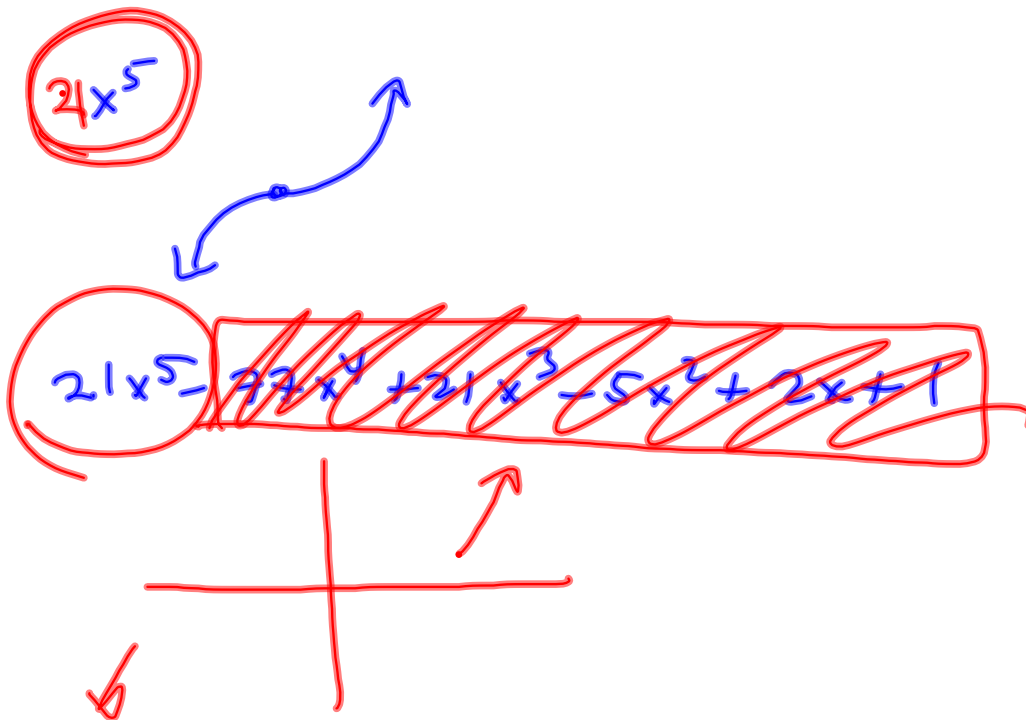
$$-5^2 = -25$$

$$3 \begin{array}{l} \underline{69} \\ 23 \end{array}$$



Want > 0

Answer: $\left(-\infty, \frac{5 - \sqrt{69}}{2}\right) \cup \left(\frac{5 + \sqrt{69}}{2}, \infty\right)$



ANY SIGN PATTERN FOR THIS
will start like this

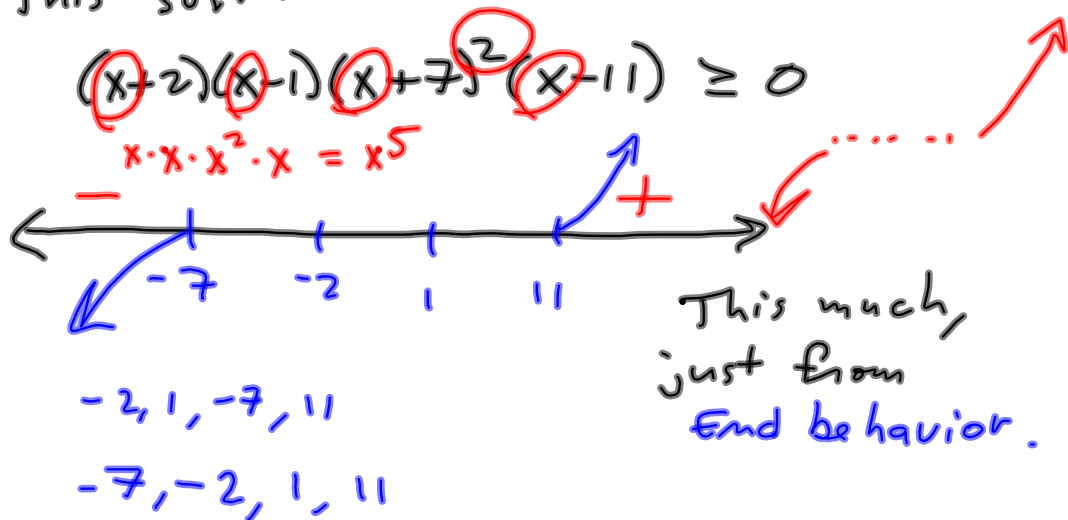
$= 0 \quad = 0 \quad = 0$

Say it has 3 real zeros,
the $21x^5$ gives you this much
of the sign pull

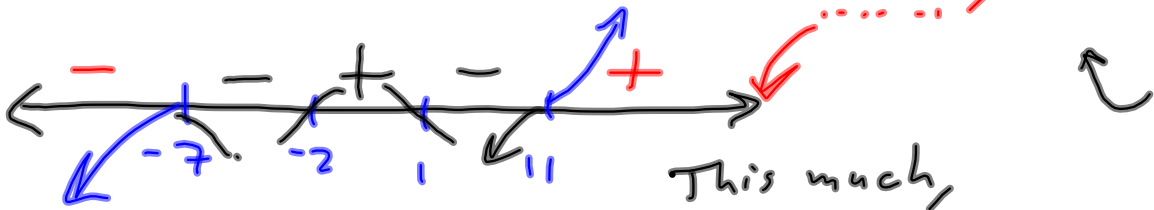


END BEHAVIOR

This discussion is HUGE for handling graphs and inequalities of this sort:



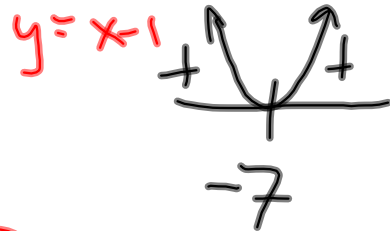
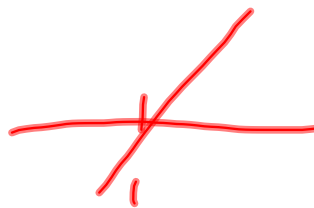
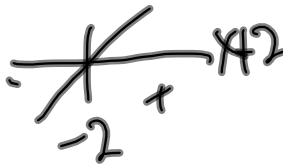
$$(x+2)(x-1)(x+7)^2(x-11) \geq 0$$



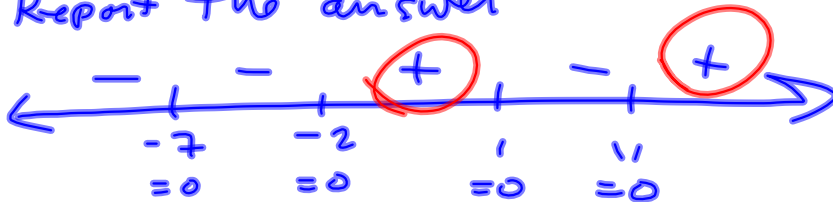
This much, just from End behavior.

$$-2, 1, -7, 11$$

$$-7, -2, 1, 11$$



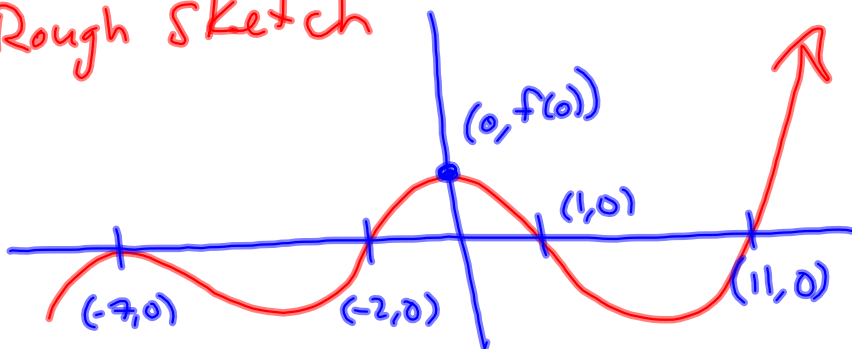
Report the answer



want ≥ 0 , +

$$\{-7\} \cup [-2, 1] \cup [11, \infty)$$

Rough sketch



$(x+7)^2$: No sign change there.

$x = -7$ is a zero of multiplicity 2.

2 is even. ~~Kisses~~ the x-axis.

Doesn't cross

S_{3.2}

Chapter 3 Video: Test 3 from
last year run-through.

Test-Point Method - Good for checking
work, but you lose forest for the trees.
AND IT'S INEFFICIENT

Remainder Theorem

Synthetic Division

$$f(x) = x^2 - 5x + 6$$

$$f(7) = ? \quad 49 - 35 + 6 = 20$$

$$\begin{array}{r}
 x-7 \overline{) x^2 - 5x + 6} \\
 \underline{-(x^2 - 7x)} \\
 0 + 2x + 6 \\
 \underline{-(2x - 14)} \\
 0 20
 \end{array}$$

$$\frac{x^2}{x} = x$$

$$\frac{2x}{x} = 2$$

$$\frac{29}{3} = \cancel{9} \frac{2}{3} = 9 + \frac{2}{3}$$

$$29 = 3 \cdot 9 + 3 \cdot \frac{2}{3}$$

$$29 = 3 \cdot 9 + 2$$

$$\begin{array}{r}
 9 \text{ r } 2 \\
 3 \overline{) 29} \\
 \underline{- 27} \\
 2
 \end{array}$$

$$\frac{x^2 - 5x + 6}{x - 7} = x + 2 + \frac{20}{x - 7}$$

$$\Rightarrow x^2 - 5x + 6 = (x - 7)(x + 2) + 20$$

$$\text{See? } f(7) = \underbrace{(7-7)}_0 (7+2) + 20 = 20 \quad !$$

$$= \frac{(x+2)(x-7)}{x-7} + \frac{20}{x-7} = \frac{x^2 - 5x - 14}{x-7} + \frac{20}{x-7}$$

$$= \frac{x^2 - 5x + 6}{x-7}$$

$$f(x) = 5x^4 - 11x^3 + 10x^2 - 13x + 50$$

what's $f(7)$?

$$\begin{array}{r} 7 \overline{) 5 \quad -11 \quad 10 \quad -13 \quad 50} \\ \underline{35 \quad 168 \quad 1246 \quad 8631} \\ 5 \quad 24 \quad 178 \quad 1233 \quad 8681 \\ \text{\color{red}x^3} \quad \text{\color{red}x^2} \quad \text{\color{red}x} \quad \text{\color{red}c} \quad \text{\color{red}r} \end{array}$$

$$f(7) = 8681.$$

I just divide $f(x)$ by $x-7$

The remainder was 8681.

here's an interpretation of the work

$$f(x) = (x-7)(5x^3 + 24x^2 + 178x + 1233) + 8681$$

§ 3.2 Assignment going up momentarily,

3.2, 3.3 Due Monday

$$\mathcal{D}(g) =$$

$$\mathcal{R}(g) =$$