$$\frac{2x^2 - x - 15}{x^2 - 4x - 21} = \frac{(2x+5)(x-3)}{(x-7)(x+3)}$$

H.A.: $y = 2$

Bonus: $\dfrac{2x^2 - x - 15}{x^2 - 4x - 21} = 2$

LCD $= (x-7)(x+3)$
$= x^2 - 4x - 21$

$$\frac{2x^2 - x - 15}{\text{LCD}} = \frac{2\,\text{LCD}}{\text{LCD}}$$

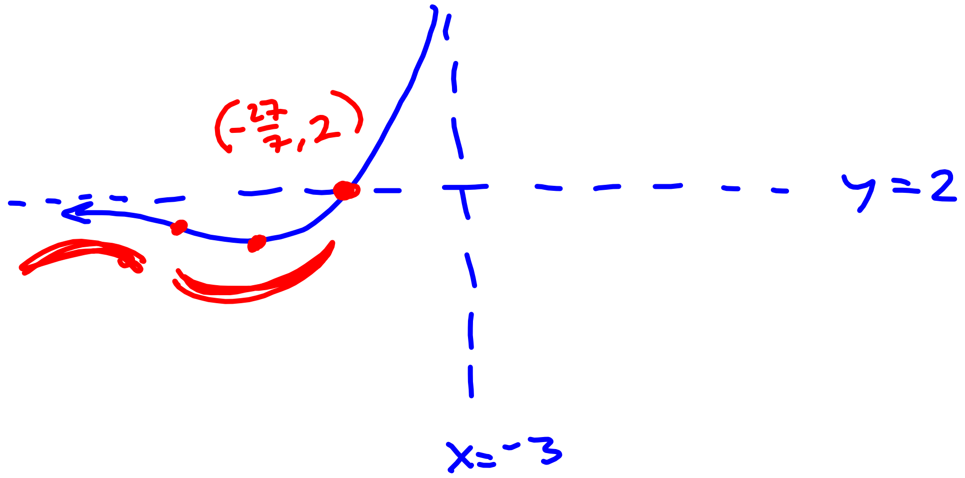
$$2x^2 - x - 15 = 2(x^2 - 4x - 21)$$

$$2x^2 - x - 15 = 2x^2 - 8x - 42$$

$$-x - 15 = -8x - 42$$

$$7x = -27$$

$$x = -\frac{27}{7} \rightsquigarrow \left(-\frac{27}{7}, 2\right)$$



Bounds on Real zeros DE-emphasized on the sit-down test.

Build poly. with real coefficients that has $x = 2, -3, 2+i$ and $-3-7i$ as zeros. Leave it in factored form.

$(x-2)(x+3)(x-(2+i))\boxed{(x-(2-i))}(x-(-3-7i))\boxed{(x-(-3+7i))}$

... with leading coefficient $a_n = 19$:

$19(x-2)(x+3)(x-(2+i))(x-(2-i))(x-(-3-7i))(x-(-3+7i))$

$(x-(2+i))(x-(2-i))$

$= (x-2-i)(x-2+i)$

$= x^2 - 2x + ix$
$\quad -2x + 4 - 2i$
$\quad -ix + 2i - i^2 \quad = x^2 - 4x + 4 + 1$
$\qquad\qquad\qquad\qquad\quad = x^2 - 4x + 5$

$= +1$

Coming soon to an algebra class near you...

$a_n x^n + a_{n-1} x^{n-1} + \dots + a_1 x + a_0$

$= \sum_{k=0}^{n} a_{n-k} x^{n-k}$

We usually write these in descending order

$= a_0 + a_1 x + \dots + a_{n-1} x^{n-1} + a_n x^n$

$= \sum_{k=0}^{n} a_k x^k$

Ascending order is more convenient for Σ-notation.

$\sum_{k=1}^{7} 3k = 3 + 6 + 9 + 12 + 15 + 18 + 21$

$= 3 \sum_{k=1}^{7} k = 3(\overbrace{1 + 2 + 3 + 4 + 5 + 6 + 7}^{28})$

$= \frac{3(7)(8)}{2} = 3 \cdot 7 \cdot 4 =$

84

$\sum_{k=1}^{n} k = \frac{n(n+1)}{2}$

$\sum_{k=1}^{100} k = \frac{100(101)}{2}$

$$\begin{array}{r} {}^{2}28 \\ \times\ 3 \\ \hline 84 \end{array}$$