BECA / Huson / Algebra 2: Polynomial functions Name: Solutions
5 March 2024

PreQuiz: Rational functions (optional plus standard)

1. Use polynomial long division to find an expression of the form $ax+b+\frac{c}{x+d}$ with a, b, c, d integers that is equivalent to $\dfrac{x^4+2x^3-7x^2+x-10}{x+3}$ for $x \neq -3$.

$$\begin{array}{r|l} & x^3 - x^2 - 4x + 13 \\ x+3 & x^4+2x^3-7x^2+x-10 \\ & x^4+3x^3 \\ \hline & -x^3-7x^2 \\ & -x^3-3x^2 \\ \hline & -4x^2+x \\ & -4x^2-12x \\ \hline & 13x-10 \\ & 13x+39 \\ \hline & -49 \end{array}$$

~~x^3-2~~

$$x^3-x^2-4x+13-\frac{49}{x+3}$$

2. Solve for x.

$$x(x-4)\frac{3}{x-4}=\frac{x-5}{x}(x)(x-4)$$

$$3x=(x-4)(x-5)=x^2-9x+20$$

$$x^2-12x+20=0$$

$$(x-10)(x-2)=0$$

$$x=2,\ 10$$

Check

$$\frac{3}{(2)-4}=\frac{(2)-5}{2}$$

$$-\frac{3}{2}=-\frac{3}{2}\ \checkmark$$

$$\frac{3}{(10)-4}=\frac{(10)-5}{10}=$$

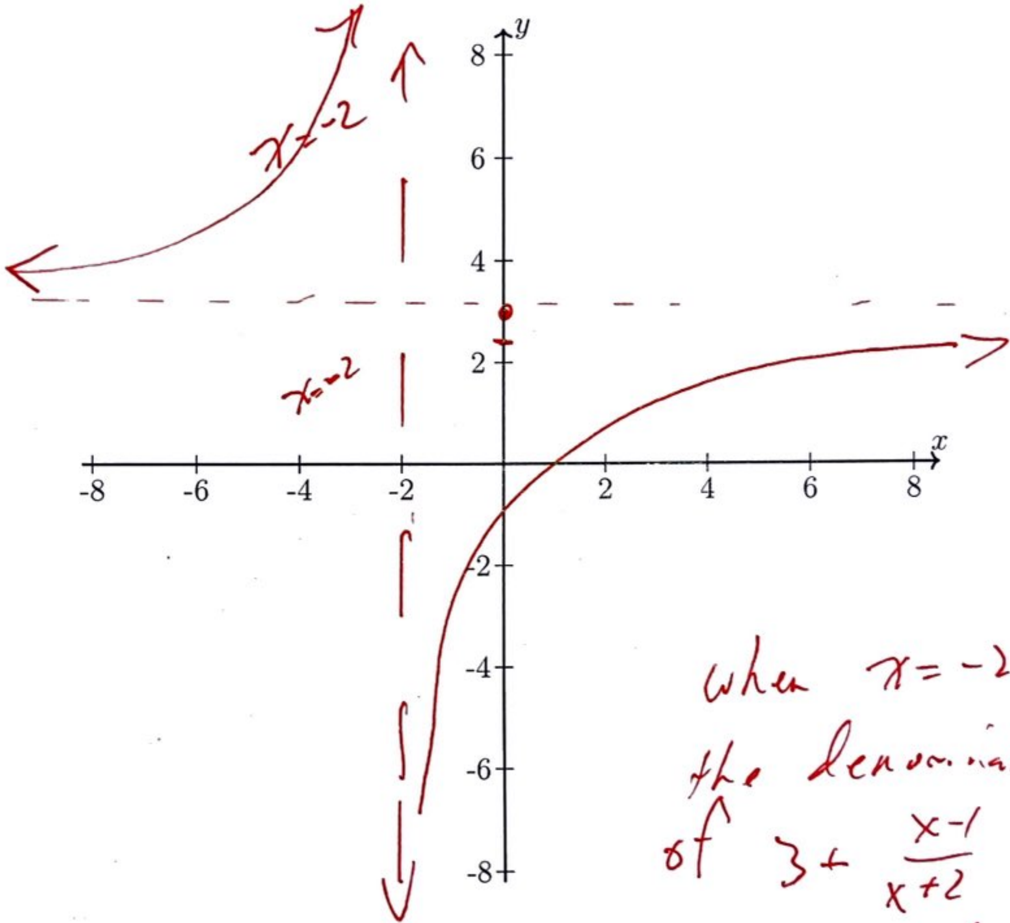
$$3/6=\frac{5}{10}\ \checkmark$$

3. Given the rational function $r(x) = 3 + \dfrac{x-1}{x+2}$.

(a) Sketch a graph of the function.

(b) Mark the vertical asymptote as dotted line and label it with its equation.

(c) Explain why the asymptote is located there.



when $x=-2$ the denominator of $3+\dfrac{x-1}{x+2}$ is zero, so the function is undefined