1 Problems

Exercise 1. What is $x^2 - 4$ divided by $x + 2$?

Exercise 2. What is $x^2 - 6x + 9$ divided by $x - 3$?

Exercise 3. What are the horizontal and vertical asymptotes of $\frac{x-6}{x+2}$?

Exercise 4. What are the horizontal and vertical asymptotes of $\frac{3x^2-1}{x^2+1}$?

Exercise 5. What are the horizontal and vertical asymptotes of $\frac{4x-1}{2x^2+3}$?

2 Answer key

Exercise 1. $x - 2$

Exercise 2. $x - 3$

Exercise 3. Horizontal asymptote: 1. Vertical asymptote: -2.

Exercise 4. Horizontal asymptote: 3. Vertical asymptote: none.

Exercise 5. Horizontal asymptote: 0. Vertical asymptote: none.

3 Solutions

Exercise 1. Either use polynomial long division or notice that $x^2 - 4 = (x - 2)(x + 2)$.

Exercise 2. Either use polynomial long division or notice that $x^2 - 6x + 9 = (x - 3)(x - 3)$.

Exercise 3. The highest degree terms are both the same in numerator and denominator, and the coefficients in front of the highest degree terms are both 1, so horizontal asymptote is 1. The denominator divides by 0 when $x = -2$ which is our vertical asymptote.

Exercise 4. The highest degree terms are powers of 2 with coefficients 3 in numerator and 1 in denominator, so horizontal asymptote is 3. There are no vertical asymptotes since the denominator is never 0.

Exercise 5. The denominator has higher degree than the numerator so the horizontal asymptote is 0. The vertical asymptote again does not exist since the denominator is never 0.