AP CALCULUS AB Dr. Paul L. Bailey Worksheet 4 - Rational Functions Wednesday, November 2, 2022 Name:

A rational function is a function of the form

$$f(x) = \frac{g(x)}{h(x)},$$

where g(x) and h(x) are polynomials.

A rational function is in *lowest form* if the numerator and the denominator have no common complex zeros. Assume that f(x) = g(x)/h(x) is a rational function in lowest form.

The degree of f(x) is max{deg(g), deg(h)}.

The zeros of f(x) are the zeros of g(x); that is, they are the solutions to g(x) = 0.

The poles of f(x) the zeros of h(x); that is, they are the solutions to h(x) = 0.

The *y*-intercept of f(x) is the point (0, f(0)).

The x-intercepts of f(x) are the points (z, 0), where z is a real zero of f(x).

The vertical asymptotes of f(x) are the lines x = p, where p is a real pole of f(x).

The polynomial asymptote of f(x) is the polynomial equation y = q(x), where q(x) is the quotient when g(x) is divided by h(x) using polynomial division.

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Rational Function: $f(x) = \frac{6}{x-2}$ Degree: Zeros: Poles: y-intercept: x-intercepts: Vertical Asymptotes: Polynomial Asymptote:

Rational Function: $f(x) = \frac{4x+2}{3x-6}$ Degree: Zeros: Poles: y-intercept: x-intercepts: Vertical Asymptotes: Polynomial Asymptote:

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Rational Function: $f(x) = \frac{x-5}{x^2+x-6}$ Degree: Zeros: Poles: y-intercept: x-intercepts: Vertical Asymptotes: Polynomial Asymptote:

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Rational Function: $f(x) = \frac{x^2 - x - 2}{x - 2}$
Degree:
Zeros:
Poles:
y-intercept:
<i>x</i> -intercepts:
Vertical Asymptotes:
Polynomial Asymptote:

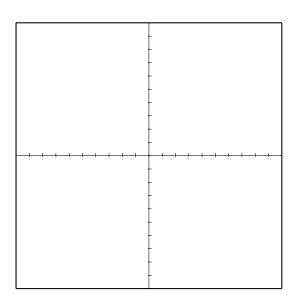
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Rational Function: $f(x) = \frac{x^2 - 49}{x^2 - 25}$ Degree: Zeros: Poles: y-intercept: x-intercepts: Vertical Asymptotes: Polynomial Asymptote:

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Rational Function: $f(x) = \frac{x^3 - x}{x^2 - 9}$ Degree: Zeros: Poles: y-intercept: x-intercepts: Vertical Asymptotes:

Polynomial Asymptote:



Rational Function: $f(x) = \frac{x^2 - 25}{x^3 - 3x^2 - 4x + 12}$
Degree:
Zeros:
Poles:
y-intercept:
<i>x</i> -intercepts:
Vertical Asymptotes:
Polynomial Asymptote:

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Rational Function: $f(x) = \frac{x^3 - 7x + 6}{x + 1}$
Degree:
Zeros:
Poles:
y-intercept:
<i>x</i> -intercepts:
Vertical Asymptotes:
Polynomial Asymptote: