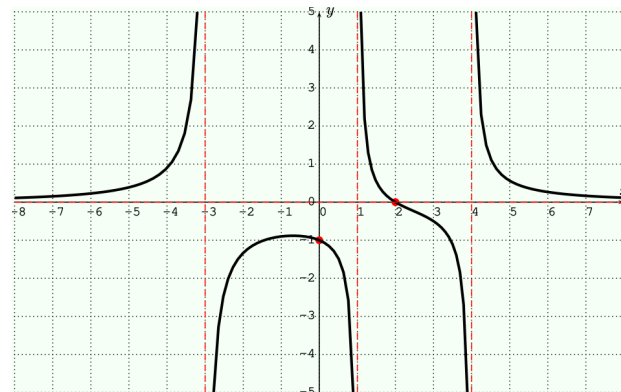


MAT 1375, Classwork10, Fall2024

ID: _____ Name: _____

1. The graph of $f(x) = \frac{p(x)}{q(x)}$ is displayed below, where $\deg(p(x)) = 1$ and $\deg(q(x)) = 3$.

Find the intercepts, asymptotes, and a formula for $f(x)$.



For 2. And 3., let $f(x) = \frac{p(x)}{q(x)}$ be a rational function and **$\deg(p(x)) > \deg(q(x))$** .

2. Rational Function and Long Division:

If $p(x)$ divided by $q(x)$ can be represented with a quotient $g(x)$ and a remainder $r(x)$

where $\deg(r(x)) < \deg(q(x))$, one can rewrite $f(x)$ as

$$f(x) = \frac{p(x)}{q(x)} = \text{_____} + \frac{r(x)}{q(x)}.$$

3. Asymptotic Behavior with Slant Asymptote:

Since $\deg(r(x)) < \deg(q(x))$, for large $|x|$ (which is $x \rightarrow \pm \text{_____}$), we have

$\frac{r(x)}{q(x)}$ approaches _____ so that $f(x)$ _____ $g(x)$.

If $g(x)$ is a linear function (which is a polynomial of degree _____), then g is called the

_____ asymptote of f .

4. Find the **slant asymptote** of the rational function $f(x) = \frac{2x^3 - 13x^2 + 35x - 26}{x^2 - 4x + 6}$.

5. The Strategy for Solving Inequalities (Application of **Number Line Test**):

Step1. Replace ">" ("≥") or "<" ("≤") by "=" and solve the equation.

Step2. Mark the solutions on the number line and check _____ in each subinterval.

Step3. Check the _____ of the subintervals to see if they are included in the solution set.

6. Given $x^3 + 15x \geq 7x^2 + 9$. Solve for x .