

MPS21 – Precalculus
Exam 5 Review Sheet

Topics:

- Rational Functions and Their Graphs
- Vertical, Horizontal, and Slant Asymptotes of Rational Functions
- Partial Fraction Decomposition

Practice Problems:

1. For each rational function, find the equations of all asymptotes and intercepts. If there are none, write “none.”

(a) $f(x) = \frac{2x+3}{x+1}$

(b) $g(x) = \frac{x^2 - 2x - 15}{x+1}$

Vertical asymptote(s): _____

Vertical asymptote(s): _____

Horizontal asymptote: _____

Horizontal asymptote: _____

Slant asymptote: _____

Slant asymptote: _____

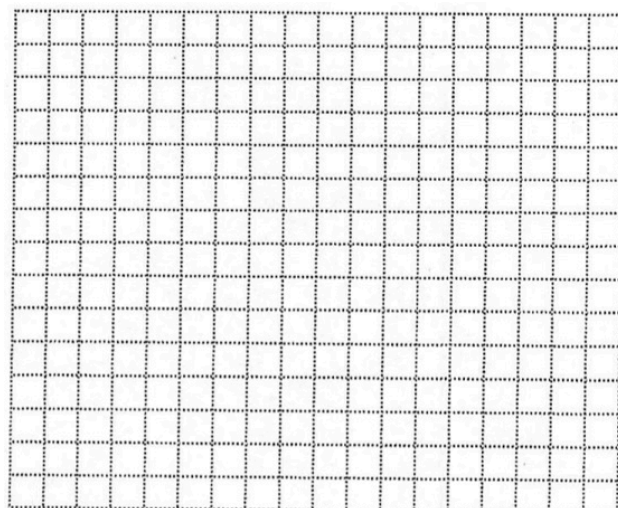
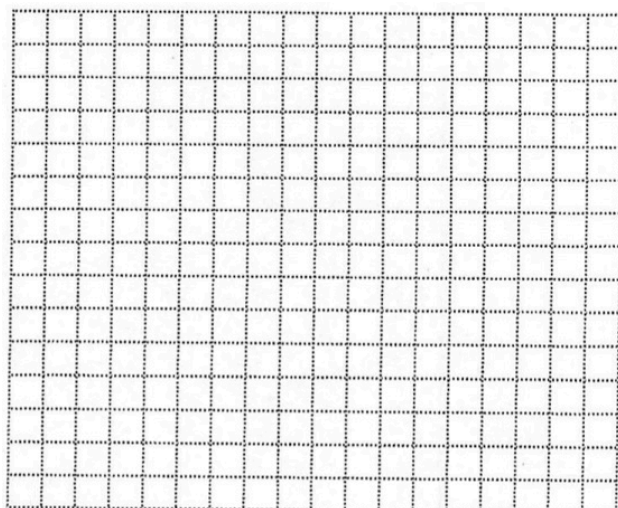
x-intercept(s): _____

x-intercept(s): _____

y-intercept: _____

y-intercept: _____

Carefully graph the above equations. Plot at least three points for each section of the graph. Draw all asymptotes with *dashed* lines.



2. Write the form of the partial fraction decomposition of each rational expression. Do not solve for the constants.

(a) $\frac{x-5}{x^2 - 2x - 3}$

(b) $\frac{2x^2 - 5x + 7}{x^3 + x^2 + 5x + 5}$

(c) $\frac{6x^2 + 1}{x^2(x-1)^3}$

(d) $\frac{x^2 + 5}{(x+1)^3(x^2 + 2x + 5)^2}$

3. Find the equation of the slant asymptote for the function: $f(x) = \frac{2x^3}{x^2 + 4}$

4. Decompose each fraction.

(a) $\frac{3x^2 + 7x - 2}{x^3 - x}$

(b) $\frac{x^2 - 2}{x^2 + x - 12}$

(c) $\frac{2x^3 - 4x^2 - 15x + 5}{x^2 - 2x - 8}$

(d) $\frac{3x^2 - 34x - 20}{x^3 + x^2 - 20x}$

(e) $\frac{8x^3 + 13x}{(x^2 + 2)^2}$

(f) $\frac{3x^2 - 7x + 1}{(x - 2)^3}$