

3.2 Reciprocal of a Quadratic Function

BLM 3-3

(page 1)

1. Copy and complete the table to describe the behaviour of the function

$$f(x) = \frac{1}{(x+2)(x+5)}$$

As $x \rightarrow$	$f(x) \rightarrow$
-2^+	
-2^-	
-5^+	
-5^-	
$+\infty$	
$-\infty$	

2. Determine the equations for the vertical asymptotes, if they exist, for each function. Then, state the domain.

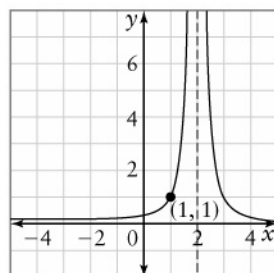
a) $f(x) = -\frac{1}{x^2 - 7x + 6}$

b) $f(x) = \frac{1}{x^2 + 4x + 6}$

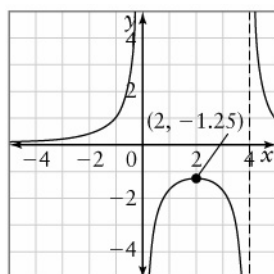
3. Make a summary table with the headings shown for each graph. Then, determine a possible equation for each graph.

Interval	Sign of $f(x)$	Sign of Slope	Change in Slope

a)



b)



4. For each function,
- determine the equations for the asymptotes, if they exist
 - give the domain
 - determine the x - and y -intercepts, if they exist
 - sketch a graph of the function
 - give a summary table of the slopes
 - give the range
 - approximate the slope of the graph at the y -intercept

a) $y = \frac{1}{(x-2)(x+4)}$

b) $y = \frac{1}{(x+4)^2}$

c) $y = \frac{1}{x^2 + 4}$

5. Sketch a graph of each function.

a) $y = -\frac{1}{x^2 - 4}$

b) $y = \frac{1}{x^2 - 5x + 4}$

c) $y = \frac{1}{2x^2 - x - 3}$

d) $y = -\frac{1}{x^2 + 4}$

6. State the coordinates of the maximum or minimum point for each of the graphs in question 5.

7. The apparent brightness of a light source is inversely proportional to the square of the distance from the light source. At a distance of 2.4 m, the brightness of a particular light source is 500 lux.

- a) Determine an equation relating the brightness of the light source and the distance from the source.
- b) Sketch a graph of the relationship.
- c) What is the brightness of the light source at a distance of 12 m?
- d) Determine the range of distances for which the brightness of the light source is less than 100 lux.

8. One method of graphing rational functions that are reciprocals of polynomial functions is to sketch the polynomial function and then plot the reciprocals of the y-coordinates of key ordered pairs. Use this method to sketch the graph of $y = \frac{1}{f(x)}$ for each function.

a) $f(x) = \frac{1}{(x-2)(x+2)(x+4)}$

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