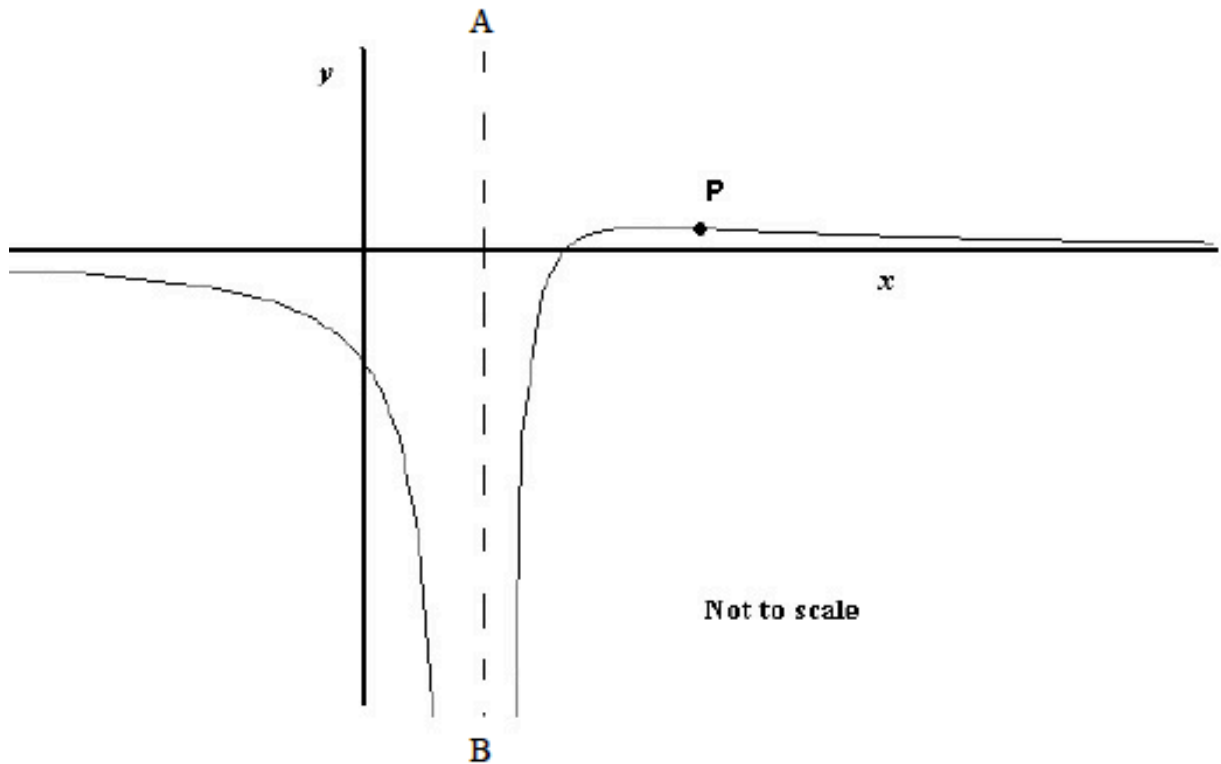


**ASSIGNMENT: Rational Functions Paper 5 Preview**

1.)

Consider the function  $h: x \mapsto \frac{x-2}{(x-1)^2}, x \neq 1$ .

A sketch of part of the graph of  $h$  is given below.



The line (AB) is a vertical asymptote. The point P is a point of inflexion.

(a) Write down the **equation** of the vertical asymptote.

[1 mark]

2.) Add the rational expression:

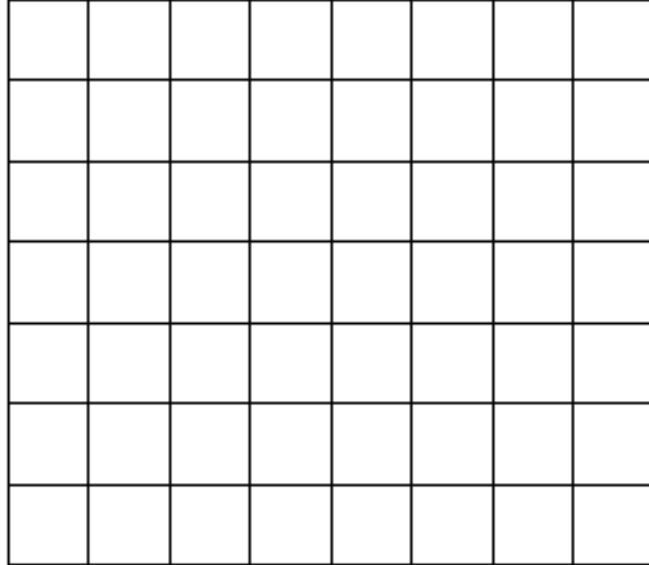
$$\frac{x}{x-3} + \frac{-18}{x^2-9} = \underline{\hspace{10em}} \quad [1 \text{ mark}]$$

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3.) The function  $f$  is defined by  $f(x) = \frac{3}{\sqrt{9-x^2}}$ , for  $-3 < x < 3$ .

(a) On the grid below, sketch the graph of  $f$ . [1 mark]



(b) Write down the equation of each vertical asymptote. [1 mark]

(c) Write down the range of the function  $f$ . [1 mark]

4.) Subtract the rational expression:

$$\frac{2x}{2x^2 + 4x} - \frac{2}{x + 2} \quad \underline{\hspace{10em}} \quad [1 \text{ mark}]$$

5.) Write the equation of the asymptote(s):

$$f(x) = \frac{x + 2}{x^2 - 4} \quad \underline{\hspace{10em}} \quad [3 \text{ marks}]$$

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6.) Solve for the extraneous solution.

$$f(x) = \frac{x+2}{x^2-4} \quad \text{_____} \quad [1 \text{ mark}]$$

7.) Write the equation of the asymptote(s):

$$f(x) = \frac{5x^2+2}{2x^2+3} \quad \text{_____} \quad [1 \text{ mark}]$$

8.) Identify the zero(s) for the function:

$$f(x) = \frac{x^2-17x+70}{3x-1} \quad \text{_____} \quad [2 \text{ marks}]$$

9.) Divide and simplify the rational function:

$$\frac{6x^2-23x+7}{6x^2+13x-5} \quad \text{_____} \quad [2 \text{ marks}]$$

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10.) Multiply and simplify the rational function:

$$\frac{x-3}{x^2-2x+1} * \frac{x-1}{x^2-9} \quad \text{_____} \quad [2 \text{ marks}]$$

11.) Which values of x are undefined in problem #10?

\_\_\_\_\_ [2 marks]

12.) Solve the rational equation and identify real and extraneous zeros.

$$\frac{1}{x-1} = \frac{x}{x-1} + \frac{x}{4} \quad \text{_____} \quad [2 \text{ marks}]$$

13.) If  $f(x) = \frac{2x}{5-x}$ , find  $g(x)$  if  $f(x)$  is horizontally compressed by a factor of  $\frac{1}{3}$  and reflected about the y-axis.

\_\_\_\_\_ [2 marks]

14.) If  $f(x) = \frac{7}{x^2-3}$ , find  $g(x)$  if  $f(x)$  is vertically stretched by a factor of 2, reflected about the x-axis, and vertically translated down 9 units.

\_\_\_\_\_ [2 marks]

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**Answer Key (I need to see calculations for credit):**

1.)  $x = 1$

2.)  $\frac{x + 6}{x + 3}$

3.)  $x = 3; x = -3; y \geq 1$

4.)  $\frac{-1}{x + 2}$

5.)  $x = 2; x = -2; y = 0$

6.)  $x = -2$

7.)  $y = 5/2$

8.)  $x = 10; x = 7$

9.)  $\frac{2x - 7}{2x + 5}$

10.)  $\frac{1}{x^2 + 2x - 3}$

11.)  $x \neq 3; x \neq -3, x \neq 1$

12.)  $x = -4$  (real zero);  $x = 1$  (extraneous zero)

13.)  $g(x) = \frac{-6x}{3x + 5}$

14.)  $g(x) = \frac{-14}{x^2 - 3} - 9$