IBDP Mathematics (SL)
Asymptote, Domain and range



Horizontal asymptote

Make denominator = 0

Vertical asymptote

Sub $x = \infty$



1. Find the equation of horizontal and vertical asymptotes of the following function.

(a)
$$y = \frac{x-3}{x+4}$$

(b)
$$y = \frac{x+2}{x-6}$$

$(b) y - \frac{1}{x-6}$		



Domain

Set of x values in the relation

Range

Set of y values in the relation

1. Find the domain and range of the following functions.

(a)
$$y = \frac{2x-2}{x+3}$$

(b)
$$y = \frac{3x+5}{2x-6}$$



Exercise

Paper 1

Let $h(x) = (f \circ g)(x)$.

- (a) Write h(x) in the form asin(bx), where a, b $\in \mathbb{Z}$.
- (b) Hence find the range of h.

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- 2. Let $f(x) = p + \frac{9}{x-q}$, for $x \neq q$. The line x = 3 is a vertical asymptote to the graph of f.
- (a) Write down the value of q.

The graph of f has a y-intercept at (0, 4).

- (b) Find the value of p.
- (c) Write down the equation of the horizontal asymptote of the graph of f.



Paper 2

- 1. Consider the graph of $f(x) = \frac{e^x}{5x-10} + 3$, for $x \ne 2$.
- (a) Find the y-intercept.
- (b) Find the equation of the vertical asymptote.
- (c) Find the minimum value of f(x) for x > 2.

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2. Let
$$f(x) = \frac{2x-6}{1-x}$$
, for $x \ne 1$.

- (a) For the graph of f
- (i) find the x-intercept
- (ii) write down the equation of the vertical asymptote.
- (iii) find the equation of the horizontal asymptote.

(b) $\lim_{x\to\infty} f(x)$.		