

## Horizontal asymptote

Make denominator = 0

## Vertical asymptote

Sub  $x = \infty$

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

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

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

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

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

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**Exercise**

**Paper 1**

1.  Let  $f(x) = 6x\sqrt{1 - x^2}$ , for  $-1 \leq x \leq 1$ , and  $g(x) = \cos(x)$ , for  $0 \leq x \leq \pi$ .

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

(a) Write  $h(x)$  in the form  $a \sin(bx)$ , 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  $f$ .

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## Paper 2

1.  Consider the graph of  $f(x) = \frac{e^x}{5x-10} + 3$ , for  $x \neq 2$ .

- (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  $x \neq 1$ .

- (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)  $\lim_{x \rightarrow \infty} f(x)$ .

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