

## Limits Set 1

... Answers are at the end

### Exercise 1

For each of the following functions  $f(x)$ , find the real limit as  $x \rightarrow \infty$  if it exists. If it does not exist, state whether the function tends to infinity, tends to minus infinity, or has no limit at all.

(a)  $f(x) = 2x^2 - 3x^3$

(b)  $f(x) = \tan x$

(c)  $f(x) = \frac{x+1}{x-1}$

(d)  $f(x) = e^{-x} \sin x$

(e)  $f(x) = e^x \cos^2 x$

(f)  $f(x) = \tan^{-1} x$

# Limits Set 1

... Answers are at the end

## Exercise 2

For each of the following functions  $f(x)$ , find the real limit as  $x \rightarrow -\infty$  if it exists. If it does not exist, state whether the function tends to infinity, tends to minus infinity, or has no limit at all.

(a)  $f(x) = 2x^2 - 3x^3$

(b)  $f(x) = \tan x$

(c)  $f(x) = \frac{x+1}{x-1}$

(d)  $f(x) = e^{-x} \sin x$

(e)  $f(x) = e^x \cos^2 x$

(f)  $f(x) = \tan^{-1} x$

## Limits Set 1

... Answers are at the end

### Exercise 3

Find each of the following real limits, if they exist. If the real limit does not exist, state whether the function tends to infinity, tends to minus infinity, or has no limit at all.

(a)  $\lim_{x \rightarrow 0} \sin x$

(b)  $\lim_{x \rightarrow 0} \sin \frac{1}{x}$

(c)  $\lim_{x \rightarrow 2} \frac{1}{x - 2}$

(d)  $\lim_{x \rightarrow 2} \frac{1}{(x - 2)^2}$

(e)  $\lim_{x \rightarrow 1} \frac{x^2 - 3x + 2}{1 - x}$

(f)  $\lim_{x \rightarrow \pi/2} \tan x$

## Limits Set 1

... Answers are at the end

### Answers

- (a) minus infinity    (b) no limit    (c) 1    (d) 0    (e) no limit    (f)  $\pi/2$
- (a) infinity    (b) no limit    (c) 1    (d) no limit    (e) 0    (f)  $-\pi/2$
- (a) 0    (b) no limit    (c) no limit    (d) infinity    (e) 1    (f) no limit