

## Worksheet 4 - Section 1.6

- (1) Evaluate the limit if it exists.

$$\lim_{t \rightarrow 0} \left( \frac{1}{t\sqrt{1+t}} - \frac{1}{t} \right).$$

- (2) If
- $4x - 9 \leq f(x) \leq x^2 - 4x + 7$
- for all
- $x/g \in \mathbb{Q}$
- , find
- $\lim_{x \rightarrow 4} f(x)$
- .

- (3) Find the limit if it exists. If the limit does not exist, explain why.

(a)  $\lim_{x \rightarrow 3} (2x + |x - 3|)$

(b)  $\lim_{x \rightarrow 0.5^-} \frac{2x-1}{|2x^3-x^2|}$

(c)  $\lim_{x \rightarrow 0^-} \left( \frac{1}{x} - \frac{1}{|x|} \right)$

(d)  $\lim_{x \rightarrow 0^+} \left( \frac{1}{x} - \frac{1}{|x|} \right)$

- (4) If
- $\lim_{x \rightarrow 1} \frac{f(x)-8}{x-1} = 10$
- , find
- $\lim_{x \rightarrow 1} f(x)$
- .

- (5) Let

$$g(x) = \begin{cases} x & \text{if } x < 1 \\ 3 & \text{if } x = 1 \\ 2 - x^2 & \text{if } 1 < x \leq 2 \\ x - 3 & \text{if } x > 2 \end{cases}$$

- (a) Evaluate each of the following, if it exists.

(i)  $\lim_{x \rightarrow 1^-} g(x)$

(ii)  $\lim_{x \rightarrow 1} g(x)$

(iii)  $g(1)$

(iv)  $\lim_{x \rightarrow 2^-} g(x)$

(v)  $\lim_{x \rightarrow 2^+} g(x)$

(vi)  $\lim_{x \rightarrow 2} g(x)$

- (b) Sketch the graph of
- $g$
- .