

## Lesson 2.5: Evaluating Limits

↳ For limits of simple functions, the quickest and easiest way to evaluate is to substitute the value that  $x$  is approaching and evaluate.

Review the limit properties for the following function:

$$\lim_{x \rightarrow 2} (x^2 - 3x + 4)$$

What do you notice?

If the function is a polynomial or rational function, and  $a$  is in the domain of  $f$  then:

$$\lim_{x \rightarrow a} f(x) = f(a)$$

## Example 1

Evaluate the following limits:

i)  $\lim_{x \rightarrow 2} (2x + 1)$



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

(iii)  $\lim_{x \rightarrow 2} \frac{x^2 - 3x - 4}{x + 2}$

(iv)  $\lim_{x \rightarrow 5} \frac{x + 2}{\sqrt{x - 1}}$

(v)  $\lim_{x \rightarrow 3} \frac{x - 3}{x + 2}$

## Lesson 2.5 Evaluate limits by substitution

**Note:** Substitution works if the limit value is defined when the value of  $x$  is substituted into the function.

(a) direct substitution works for all polynomial functions

(b) rational functions as long as the denominator does not equal zero

(c) square root function as long as the radical is positive

