

Algebra and Limits

$$(a-b)^2 + 1 = C$$

$$C. (a-b)^2 = 20, \quad \text{calculate } C$$

$$a - b = x$$

$$x^2 + 1 = c \Rightarrow x^2 = c - 1$$

$$c \cdot x^2 = 20$$

$$c \cdot (c-1) = 20$$

$$c^2 - c - 20 = 0$$

$$(c-5)(c+4) = 0$$

$$\begin{array}{ccc} \downarrow & \downarrow & \\ C = 5 & C = -4 & \Rightarrow (a-b)^2 + 1 = -4 \quad \text{complex number} \end{array}$$

$$(a-b)^2 + 1 = 5, \quad (a-b)^2 = 4 \quad a-b = \pm 2 \quad c = 5$$

Limits

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

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

$$\lim_{x \rightarrow 2} (x^2 + 1) = 2^2 + 1 = 5$$