

<b>11</b>	<b>2a</b>	Let $P(x) = x^3 - ax^2 + x$ be a polynomial, where $a$ is a real number. When $P(x)$ is divided by $x - 3$ the remainder is 12. Find the remainder when $P(x)$ is divided by $x + 1$ .	<b>3</b>
$P(x) = x^3 - ax^2 + x$ $P(3) = (3)^3 - a(3)^2 + 3$ $= 27 - 9a + 3 = 12$ $-9a = 12 - 30$ $-9a = -18$ $a = 2$ $\therefore P(x) = x^3 - 2x^2 + x$ $P(-1) = (-1)^3 - 2(-1)^2 + (-1)$ $= -1 - 2 - 1$ $= -4$			State Mean: <b>2.63/3</b>

\* These solutions have been provided by [projectmaths](http://projectmaths.com.au) and are not supplied or endorsed by the Board of Studies

### Board of Studies: Notes from the Marking Centre

While in some responses candidates wrote a statement, such as  $P(3)=12$ , they did not substitute correctly into  $P(x)$ . Where long division was used, the correct values of  $a$  or  $P(-1)$  were generally not found. Some wrote that  $P(-1)=-4$  then concluded that the remainder was 4, suggesting a lack of understanding of the remainder theorem.

**Source:** [http://www.boardofstudies.nsw.edu.au/hsc\\_exams/](http://www.boardofstudies.nsw.edu.au/hsc_exams/)