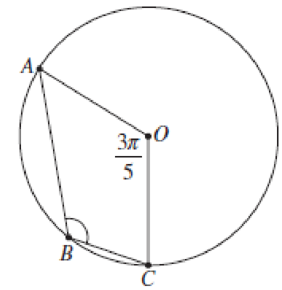
13	**3**	The points *A*, *B* and *C* lie on a circle with centre *O*, as shown in the diagram. The size of $\angle AOC$ is $\frac{3\pi}{5}$ radians. What is the size of $\angle ABC$ in radians? (A) $\frac{3\pi}{10}$ (B) $\frac{2\pi}{5}$ (C) $\frac{7\pi}{10}$ (D) $\frac{4\pi}{5}$	**1**



Not to scale

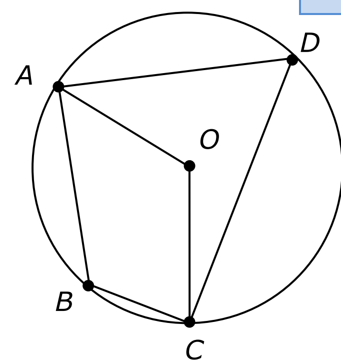
State Mean:
0.49

C

$\angle ADC = \frac{3\pi}{10}$ ($\angle$ at centre is twice $\angle$ at circum on same arc)

$\angle ADC = \pi - \frac{3\pi}{10}$ (opp $\angle$s of cyclic quad supp)

$= \frac{7\pi}{10}$



* These solutions have been provided by *projectmaths* and are not supplied or endorsed by the Board of Studies

(i) A factor of $(x - 3)$ means $P(3) = 0$:

$$P(3) = (3 + 1)(3 - 3)Q(3) + 3a + b = 0$$

$$3a + b = 0 \quad \ldots\ldots\ldots\ldots\ (1)$$

Also, $P(-1) = 8$:

$$P(-1) = (-1 + 1)(-1 - 3)Q(-1) - a + b = 8$$

$$-a + b = 8 \quad \ldots\ldots\ldots\ldots\ldots\ (2)$$

(1) − (2):

$$4a = -8$$

$$a = -2$$

Subs in (1):

$$3(-2) + b = 0$$

$$-6 + b = 0$$

$$b = 6$$

$\therefore a = -2$ and $b = 6$

(ii) As $P(x) = (x + 1)(x - 3)Q(x) - 2x + 6$, then the remainder is $-2x + 6$

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Board of Studies: Notes from the Marking Centre

(i) While many candidates interpreted the information given in the question sufficiently to write a statement like $P(3) = 0$, they did not use this to substitute correctly into the expression for $P(x)$. Some tried to solve convoluted equations.

(ii) A substantial number of candidates did not attempt this part. Of those who attempted it, many substituted their values of a and b from (i) into $P(x)$ but then attempted either to solve or to divide, indicating that they had not really understood the notion of a polynomial remainder. A few candidates correctly identified the remainder.

Source: http://www.boardofstudies.nsw.edu.au/hsc_exams/