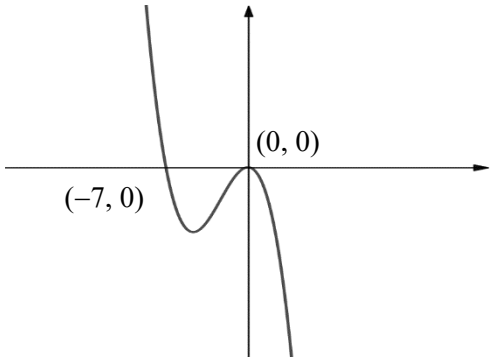
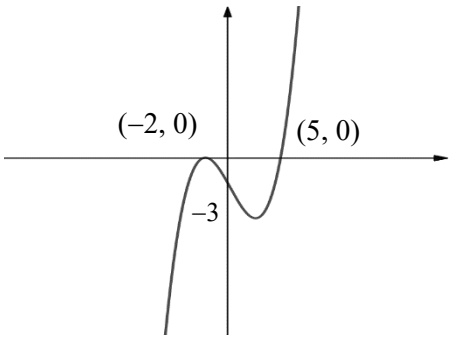
Question	Scheme		Marks
5(i)(a)		B1 Horizontal translation ← B1 Maximum at origin B1 $(-7,0)$	B1B1B1
			(3)
(b)		B1 Reflection in y-axis B1 Touches at $(-2,0)$ and passes through $(5,0)$ B1 Passes through $(0,-3)$	B1B1B1
			(3)
(ii)a	$x=0 \Rightarrow y=k\cos\left(\frac{\pi}{6}\right)=\sqrt{3}$ $k\frac{\sqrt{3}}{2}=\sqrt{3} \Rightarrow k=2$		B1
(b)	$\left(p=\right)\frac{\pi}{3}$ **or** $\left(q=\right)\frac{4\pi}{3}$ $\left(p=\right)\frac{\pi}{3}$ **and** $\left(q=\right)\frac{4\pi}{3}$		B1 B1
			(3)
			(9 marks)

Notes

(i)(a)

B1 Horizontal translation ←
The negative cubic should appear in quadrants 2, 3 and 4 only and the local maximum should be on the x axis where $x \leq 0$. The local minimum must be in the third quadrant. Condone any part of the graph which may look linear but withhold this mark if the graph curves back on itself.

B1 Local maximum at the origin (does not need to be labelled)

B1 Passes through (−7, 0). Allow just the x value instead of both coordinates marked on the axis or written in the text and condone a slip of x and y the wrong way round as long as the sketch would give the correct coordinates. May be listed but cannot be awarded without a sketch. Condone lack of brackets. Do not allow 7 instead of -7 but condone transcription errors if the correct coordinate is stated in the text.

(b)

B1 Reflection in the y-axis. A positive cubic should be drawn appearing in quadrants 1, 3 and 4 only. The local maximum point should be on the x axis where $x \leq 0$ and the local minimum point should be in quadrant 4. Do not accept the local minimum on the y-axis.

B1 Touches at (−2, 0) and passes through (5, 0). Allow just the x values instead of both coordinates marked on the axis or written in the text and condone a slip of x and y the wrong way round as long as the sketch would give the correct coordinates. May be listed but cannot be awarded without a sketch. Condone lack of brackets. Do not allow 2 instead of -2 or -5 instead of 5 but condone transcription errors if the correct coordinates are stated in the text.

B1 Passes through (0, −3). Allow just -3 instead of both coordinates marked on the axis or written in the text and condone a slip of x and y the wrong way round as long as the sketch would give the correct coordinates. May be listed but cannot be awarded without a sketch. Condone lack of brackets.
Do not allow 3 instead of -3 but condone transcription errors if the correct coordinate is stated in the text.

(ii)(a)

B1 $k = 2$

B1 $(p =)\ \frac{\pi}{3}$ **or** $(q =)\ \frac{4\pi}{3}$ Award for sight of either of these values or equivalent. Ignore labelling.
Allow awrt 1.05 or awrt 4.19 for this mark and allow in degrees (60 or 240).

B1 $(p =)\ \frac{\pi}{3}$ **and** $(q =)\ \frac{4\pi}{3}$ ignore labelling and condone $\left(0, \frac{\pi}{3}\right)$, $\left(0, \frac{4\pi}{3}\right)$. Allow exact equivalents.

Question	Scheme	Marks
6(a)	E.g. $m=\dfrac{2-11}{8+4}$ or $m=\dfrac{11-2}{-4-8}$	M1
	$m=-\dfrac{3}{4}$	A1
		(2)
(b)	M is $\left(2,\ \dfrac{13}{2}\right)$	B1
	$m_N=-1\div"-\dfrac{3}{4}"$	M1
	$y-"\dfrac{13}{2}"="\dfrac{4}{3}"(x-"2")$	M1
	$8x-6y+23=0$	A1
		(4)
(c)	$AB=\sqrt{(-4-8)^2+(11-2)^2}\ (=15)$ or $AB^2=(-4-8)^2+(11-2)^2\ (=225)$	M1
	$\dfrac{1}{2}\times MC\times AB=37.5\Rightarrow MC=\dfrac{75}{15}\ (=5)$ or $MC^2=25$	M1
	$m_N=\dfrac{4}{3}, MC=5\Rightarrow\ C$ is $\left("2"-3,\ "\dfrac{13}{2}"-4\right)$ or $\left("2"+3,\ "\dfrac{13}{2}"+4\right)$	dM1
	$(-1,\ 2.5)$ **or** $(5,\ 10.5)$ **or** $x=-1,\ x=5$ **or** $y=2.5,\ y=10.5$	A1
	$(-1,\ 2.5)$ **and** $(5,\ 10.5)$	A1
		(5)
		(11 marks)

Notes

(a)

M1 Correct gradient method. Method must be correct for **both** the numerator and denominator.
Could also be solved by setting up two simultaneous equations and solving correctly.
ie $11=-4m+c \quad 2=8m+c \quad \Rightarrow 9=-12m\Rightarrow m=...$ (M1)

A1 Correct fraction or decimal (allow $\dfrac{-3}{4}$ or $\dfrac{3}{-4}$ or -0.75). If they find the equation of the line then they must identify $-\dfrac{3}{4}$ as the gradient.