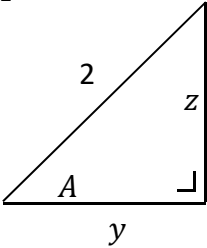**Question 4** **(25 marks)**

(a) Find **all** the values of x for which $\cos(2x) = -\frac{\sqrt{3}}{2}$, where $0° \leq x \leq 360°$.

(b) Let $\cos A = \frac{y}{2}$, where $0° < A < 90°$. Write $\sin(2A)$ in terms of y.

Q4	Model Solution – 25 Marks	Marking Notes
(a)	$2x = 150 + 360n$ or $2x = 210 + 360n$ $x = 75 + 180n$ $\qquad$ $x = 105 + 180n$ $n = 0 \Rightarrow x = 75°$ $\quad$ $n = 0 \Rightarrow x = 105°$ $n = 1 \Rightarrow x = 255°$ $\quad$ $n = 1 \Rightarrow x = 285°$	**Scale 20C (0, 7, 13, 20)** *Low Partial Credit:* 30° or 150° or 210° *High Partial Credit:* 2 relevant values of x
(b)	$2^2 = y^2 + z^2$ $\qquad z = \sqrt{4 - y^2}$ $\sin 2A = 2\sin A\cos A$ $2\left(\dfrac{\sqrt{4 - y^2}}{2}\right)\left(\dfrac{y}{2}\right)$ $= \dfrac{y\sqrt{4-y^2}}{2}$ **Or** $\sin 2A = \dfrac{2\tan A}{1 + \tan^2 A}$ $\dfrac{2\frac{\sqrt{4-y^2}}{y}}{1+\frac{4-y^2}{y^2}} = \dfrac{2y\sqrt{4-y^2}}{y^2+4-y^2} = \dfrac{y\sqrt{4-y^2}}{2}$	**Scale 5C (0, 2, 4, 5)** *Low Partial Credit:* $\sqrt{4 - y^2}$ $2\sin A\cos A$ without substitution $\sin 2A$ expressed in tan A format Relevant labelled diagram $(2, y, A)$ *High Partial Credit:* Substitution for sin A or cos A in formula $\sin A = \left(\dfrac{\sqrt{4-y^2}}{2}\right)$ $\tan A = \dfrac{\sqrt{4-y^2}}{y}$